

53  
May, 1931

# RADIO

THE NATIONAL TRADE MAGAZINE



REG.  
U. S. PAT.  
OFF.

## THIRD OUT OF THIRTY

"What factory receivers do you recommend?" 67,208 service men were asked that question recently by Citizen's Radio Call Book magazine.

Selected for third place out of the thirty best known names in radio — was Silver-Marshall!

Service men KNOW radios, and when they stake their professional reputations on a brand it is a safe bet that THAT set will stay sold. And there are no better salesmen in the world than satisfied customers.

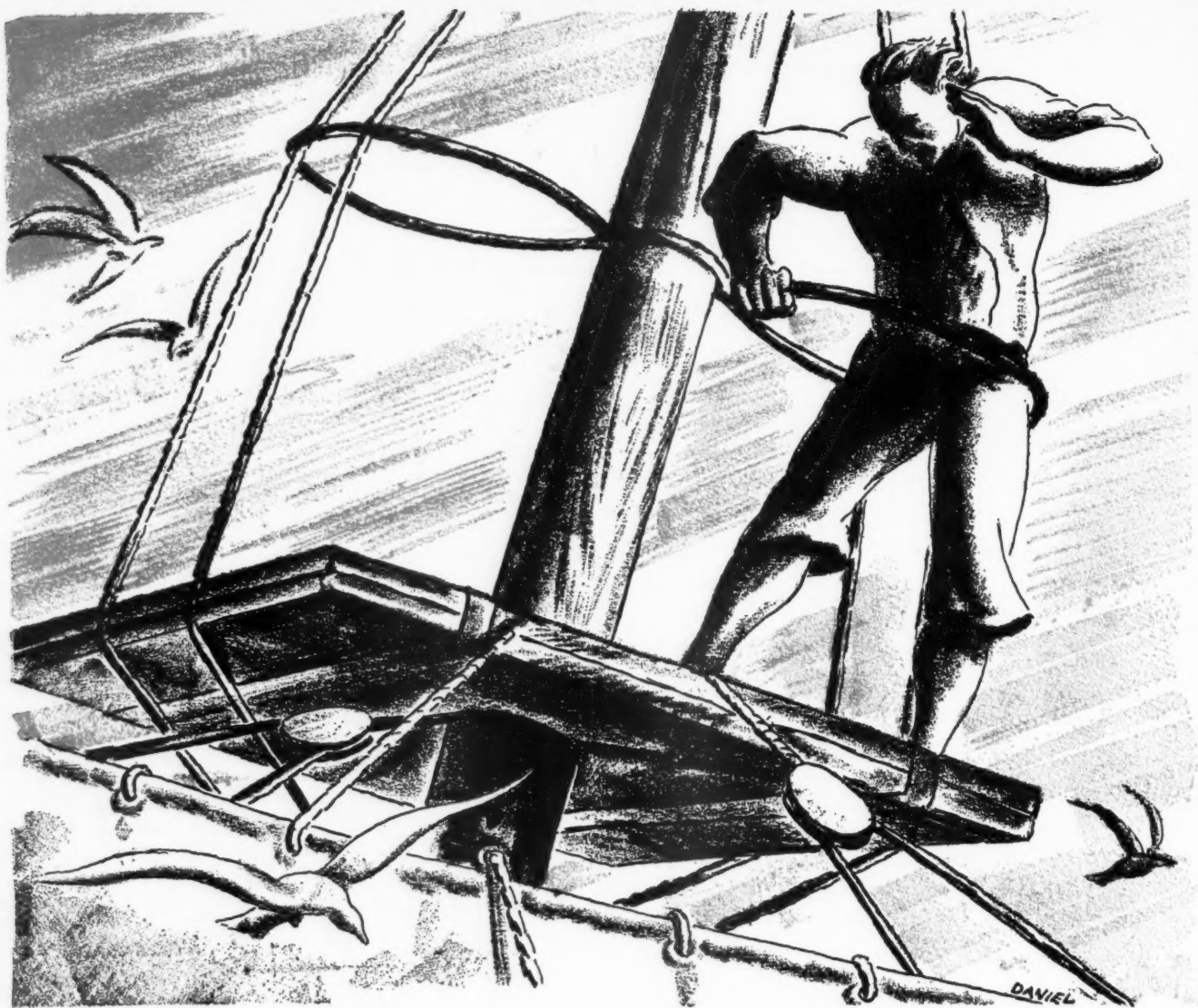
Next month Silver-Marshall will shake up the industry with an announcement.

Not only unbeatable merchandise at unbeatable prices  
but a revolutionary new sales plan!

*Superheterodyne*  
*by* **SILVER-  
MARSHALL**

6415 West 65th Street, Chicago, U. S. A.

122 East 42d Street, New York City



## The lookout calls from the mast-head.

Perched far above the deck of the ship, the lookout man is in a position to sweep the farthest horizon. In industry, business leaders and the men at the top can see farther ahead than the rest of us.

The call from the mast-head now tells definitely of clearer horizons and fairer weather

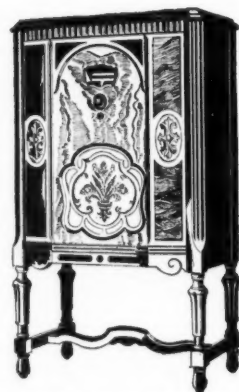
ahead. Far-sighted dealers are preparing themselves now for this future business with fewer lines and merchandise of unquestioned quality and established reputation.

*Brunswick Radio Corporation*

MANUFACTURERS OF RADIO, PANATROPE AND  
THE WORLD-FAMOUS BRUNSWICK RECORDS

NEW YORK—CHICAGO—TORONTO

SUBSIDIARY OF WARNER BROS. PICTURES, INC.



BRUNSWICK LOWBOY  
MODEL 15

Armored chassis with 4 screen-grid tubes and two 45's in parallel. Uni-Selector and Illuminated Horizontal Tuning Scale. Tone Control. Cabinet of seasoned and selected butt-walnut with carved front panels. **\$139.50**  
Other models \$170 up (less tubes)

# BRUNSWICK RADIO

At the Trade Show  
Booth 52  
Exhibition Hall

Demonstration  
Rooms Nos. 556-557  
Stevens Hotel



**LIFT IT!**

Weight, 23 Pounds  
(Compare It With Others)  
Depth, Six Inches  
(Individually Different)

# **Echophone**

**WILL MAINTAIN ITS LEADERSHIP**

**R. M. A. SHOW ««« STEVENS HOTEL »»» WILL BE THE PROVING GROUNDS**

**\$69.50**

**SUPERHETERODYNE**

**\$69.50**

COMPLETE WITH TUBES

## **ECHOPHONE**

. . . long recognized in the radio industry as an instrument of the finest proven quality in every detail, now challenges the world for superlative performance superiority under all conditions.

ECHOPHONE is unique in the compact arrangement of unit construction. Amazingly sensitive, it penetrates to extreme distances. Highly developed selectivity permits you to USE its great power without restraint or fear of interference by close-in stations.

Address

**ECHOPHONE RADIO MFG. CO., LTD.**

Factory: 104 LAKEVIEW AVE., WAUKEGAN, ILL.

Executive Office: 400 WAUKEGAN STATE BANK BLDG., WAUKEGAN, ILL.

Tell them you saw it in RADIO



Established  
1917

# RADIO

REGISTERED  
U. S. Pat. Off.

THE NATIONAL TRADE MAGAZINE

VOLUME 13 ||||| NUMBER 5

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<i>The census bureau recently made the statement that the average life of a radio set is four years. A brief survey of radio history and a look into the future seems to bear out the prevailing truth of this declaration, which should be very encouraging to the radio dealer.</i>		New Radio Products.....	32
Make the Trade Show Profitable to You.....	22	Ring the Bell.....By B. E. ESTES	40
<i>What to look for at Chicago, June 8th. Also complete program of Convention meetings.</i>		<i>A description of an ingenious device which will show the customer whether his tube is good or not by ringing a bell. It is also invaluable for testing intermittent shorts without making the dealer or service man camp beside the tester waiting for the elements to short.</i>	

P. S. LUCAS, Editor

General Office—Pacific Building, San Francisco

BRANCH OFFICES

New York . . . . . 415 Lexington Avenue  
Chicago . . . . . 211 West Wacker Drive  
Boston . . . . . 86 St. Botolph Street  
Los Angeles . . . . . 508 Crane Boulevard

H. W. DICKOW, Business Manager

SUBSCRIPTION RATES: \$2.00 per year in the United States;  
\$3.00 per year in Canada and foreign countries.

Entered as second-class matter at the Post Office at San Francisco, California, under the Act of March 3, 1879.



It's Easy To Identify 1931 Tubes

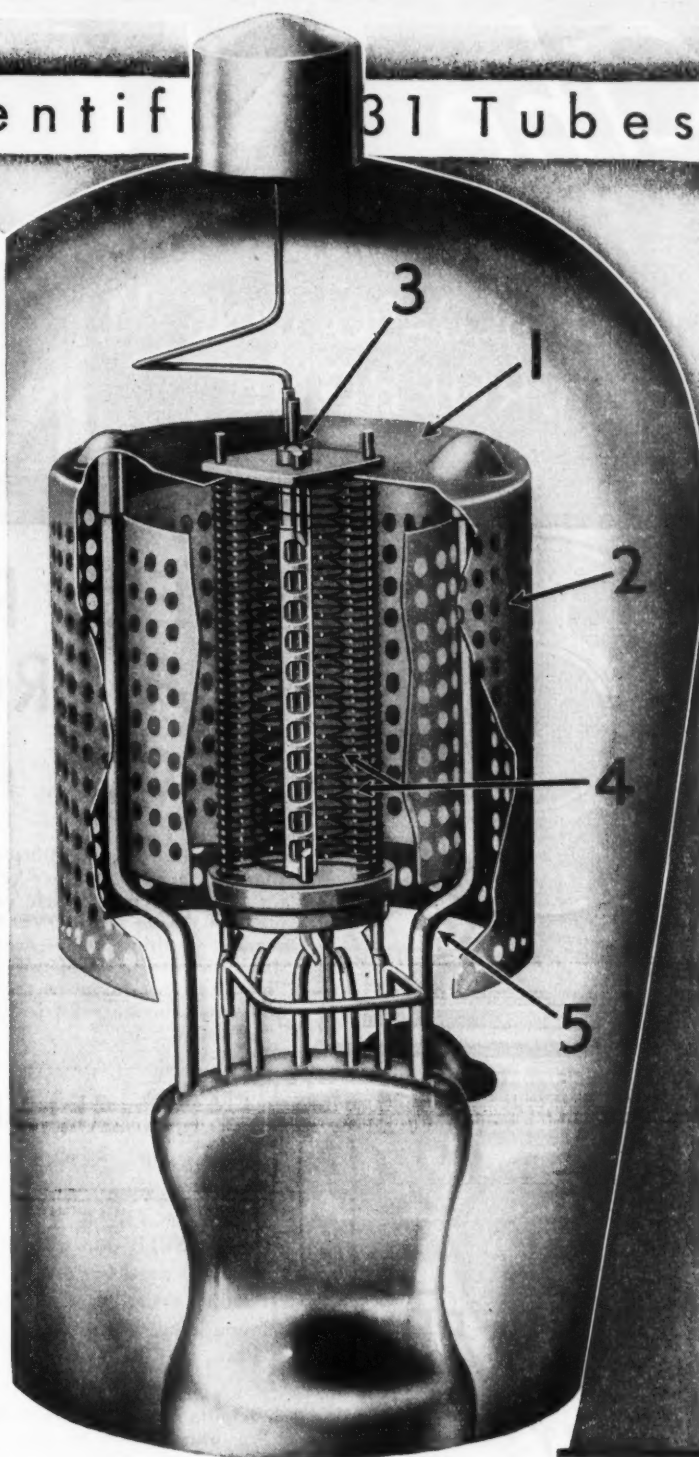
## Look for Clean-Cut Screen-Grids

Minimum metal for maximum electrical and mechanical strength—that is the true test of a screen-grid tube. De Forest engineers have attained those prerequisites by

1. Plate instead of mesh for greater degassification, increased strength and closer tolerances.
2. Perforations to decrease possible secondary emission.
3. Patented De Forest notched cathode insulator for practical quick-heater performance.
4. Molybdenum wire for both grids, costing 20 times as much as nickel. Higher melting point permits greater degassification.
5. Continuous support for outside screen, insuring maximum rigidity.

These and many other advanced features found in every type of Fresh De Forest Audion, insure the 1931 performance of any radio set.

*This is the fifth of a series of debunking messages dealing with 1931 radio tube features. The entire story can be sent to you immediately, upon request.*



**de Forest**  
AUDIONS  
RADIO TUBES



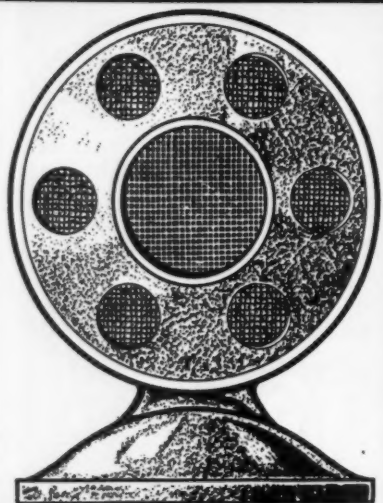
DE FOREST RADIO CO., PASSAIC, N. J.

After all, there's no substitute for 25 years' experience

Tell them you saw it in RADIO

# The NOVO

## HOME BROADCASTING "MIKE"



### EVERY RADIO OWNER IS A PROSPECT FOR A \$5.00 MICROPHONE

Many dealers pass up Microphones simply because they don't know of the countless uses which can be made of them. The NOVO MIKE requires nothing else — excepting the radio set—to enable anyone to "broadcast" at home to the thrill and entertainment of friends.

The NOVO MIKE connects to the detector tube by means of a simple connector. You press a button—the radio music ceases and you TALK right thru the radio set. Release the button and the radio set resumes the programs from the air. Use it for store announcements. For the home. For outdoor purposes. For theatres. For a hundred and one other uses.

**\$5.00**  
LIST PRICE

### FAST SELLER!

HOOK-UP a NOVO MIKE to a set in your store. Let your prospects HEAR it in operation. SELL one with EVERY set. It's good business. It makes selling easier. You'll never know how good they are until you try one.

**Dealers-**

**JOBBERS . . PLEASE  
WRITE FOR PRICES**

NOVO MIKE is helping other dealers everywhere to increase profits. We want YOU to have a NOVO MIKE without further delay. Order one . . . or a standard display card of THREE NOVO MIKES immediately. Once you begin selling NOVO MIKES you will wonder why you waited so long. ACT NOW . . . a convenient order blank is here for your immediate use.

**AMERICAN LABORATORIES, LTD.**

2903 Beverly Boulevard

Los Angeles, California

AMERICAN LABORATORIES, LTD.  
2903 Beverly Boulevard, Los Angeles, Calif.

RADIO

Send \_\_\_\_\_ NOVO-MIKES and \_\_\_\_\_ display cards at once. Ship C.O.D. at NET price.

Name \_\_\_\_\_

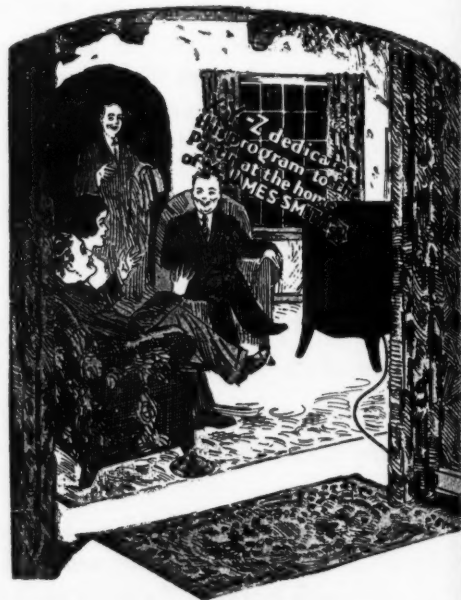
Address \_\_\_\_\_

City and State \_\_\_\_\_

**LARGE WINDOW CARD  
FOR DEALERS . . . . .**

A strikingly colorful LARGE window card, with a NOVO-MIKE mounted on it, helps you sell NOVO-MIKES. By all means, get at least ONE today.

**ORDER AT ONCE!**



# PENTODE

the A. C. Tube  
first demonstrated  
by CeCo engineers  
in January 1930

**T**HIS new 1-tube type . . . that delivers a greater undistorted power output . . . is a development pioneered by the CeCo Laboratories.

Over 15 months ago—on January 23, 1930—CeCo Engineers demonstrated the first A. C. Pentode receiving set, using the newly developed Pentode Tube.

Since the introduction of the first A. C. Pentode, the CeCo Laboratory has also pioneered two additional Pentode Tubes—the P-1 and the P-5. Both of these tubes were used in a receiving set demonstration at the R. M. A. Trade Show at Atlantic City in June, 1930. That was ten months ago.

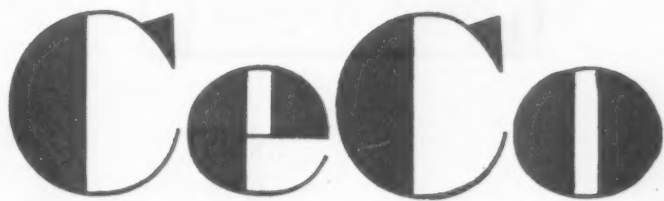
Recently the Radio Tube Sub-Committee of the Radio Manufacturers Association suggested standard specifications to popularize the Pentode. These standard specifications will permit the adoption of this tube by receiving set manufacturers.

The new CeCo Pentode Tube—Pentode Type P-3—is in conformity with these specifications. It is a product of the laboratories that pioneered the Pentode.

CeCo Mfg. Co., Inc., Providence, R. I.

*They're Better or You Don't Pay*

Tell them you saw it in RADIO



Licensed Under Patents of Radio Corp. of America

## Radio Tubes





# TRIAD

The  
HONOR-BUILT  
TUBE

## Sets the Pace



**T**HE Proven Products of TRIAD were found in most of the midget receivers. Midget popularity and TRIAD popularity increase as the months pass by. First by choice among the midget manufacturers.

## TWO NEW TUBES

*TRIAD*  
**PENTODE**  
Power Amplifier

*Quality  
Durability  
Uniformity*

*TRIAD*  
551 Super-Control  
Screen Grid

**INSIST  
ON  
TRIAD**



**THE  
HONOR-BUILT  
TUBE**

**Triad Manufacturing Co., Inc. Pawtucket, R. I.**

West Coast Distributors  
**R. J. NOEL COMPANY**

**SEATTLE**  
1518 First Ave., South

**LOS ANGELES**  
1441 W. Jefferson Boulevard

**SAN FRANCISCO**  
704 Larkin Street

# WRIGHT-DE COSTER REPRODUCERS

*Known Throughout the Industry  
for Their High Standard of Excellence*



Model 207



Model 217 Jr.



JUVENILE



INFANT

*Be Sure to See the New Models*

*WRIGHT-DECOSTER Have Added to Their Line  
They Will Be Shown at the R. M. A. Trade Show  
June 8th to 12th, Demonstration Room No. 60  
Fourth Floor, Stevens Hotel, Chicago, Illinois*



The Speaker  
of the Year

You will be extremely interested in our new manufacturers models---the *Juvenile* and *Infant*. They will enhance the sales value of your receivers by improving their quality.



The Speaker  
of the Year

{ WRITE FOR ADDRESS OF NEAREST SALES OFFICE }

## WRIGHT-DE COSTER, INC.

2217 UNIVERSITY AVE., ST. PAUL, MINNESOTA

Export Dept.: M. Simons & Son Co., 25 Warren St., New York, N. Y. Cable Address: Simontrice, New York

# HOME RECORDING

Now Made Simple and INEXPENSIVE

WITH

## UNIVERSAL PRODUCTS

### A VAST NEW MARKET AWAITS YOU

It's all the rage . . . HOME RECORDING. Everywhere you see and hear it. NOW you can get UNIVERSAL products for the assembly of your own home recording device. It's a simple matter to make your own recordings if you use UNIVERSAL parts. All that is required is microphone—input stage—phonograph motor and pick-up, and the soft aluminum records which UNIVERSAL also offers for sale. Write us immediately for a blueprint showing the utter simplicity and ease of assembly of these few compact units. The two items here illustrated are the BACKBONE of a GOOD home recording outfit. Get one of each. Get started. Your customers will buy them because they are PERFECT in performance and low in price.

### UNIVERSAL HANDI-MIKE FOR HOME RECORDING

A single button hand microphone for radio receiving set operation, for personal call systems, etc. Equipped with thumb switch and 6-ft. cord. Handi-Mike is decidedly a microphone in both appearance and operation, and responds to frequencies from 70 to 2000 cycles. The button is 200 ohms. Packed in individual boxes. Size head, diameter 2 1/4 in.; length overall, 6 in. Net weight, 1 lb. Packed weight, 1 1/2 lbs.

List Price \$10.00



Aluminum Records for Making Your Own Recordings. Write for Prices.



Junior Radio and Amplifier Input Stage. For use with any single button microphone. Consists of microphone input transformer, switch and battery bracket in neat wooden box. List price \$8.00

## UNIVERSAL MICROPHONES

FROM \$5.00 TO \$350

For Every Possible Use . . . Anywhere

There is a UNIVERSAL MICROPHONE for every requirement . . . from the smallest \$5.00 mike for amateur telephone use to the \$350 condenser microphone for broadcast stations. UNIVERSAL gives you a vastly superior product.

We are the largest manufacturers of microphones in the world. Once you use a UNIVERSAL you will not be content with any other. Many other accessories for voice reproduction are built by us. Our line is complete. Investigate!

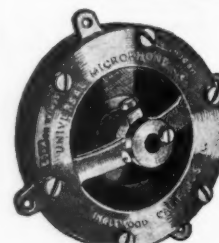
WRITE FOR 32 PAGE CATALOG JUST OUT. A Post Card Request Brings It.

### Announce Thru Your Radio

**\$7.50** BABY MIKE is a real microphone, single button with circuit switch and 25 foot cord. The case is 3 inches high. The button is gold plated and the response of far better quality than would be expected for the low price of \$7.50. A sheet of instructions is included. Weight 12 oz.



### Model "BB"



LIST PRICE \$25.00

With Gold Spot Metal Diaphragm. A two-button microphone built especially for voice pick-up, public address work and for amateur broadcasters and experimenters. Its frequency range is from 50 to 4000 cycles, 200 ohms per button. A split primary microphone input transformer must be used with this microphone. Accurately machined, and silver plated. Made in 3 degrees of sensitivity: S—Very Sensitive; M—Medium Sensitive (Standard); D—Highly Damped.

### REPRESENTATIVES

Exporters—Ad Auriema, 116 Broad St., New York City.  
Western Pennsylvania, West Virginia—Baumgarten, Frank, A., 429 Penn Ave., 212 Professional Bldg., Pittsburgh.  
Minnesota—Barnard, Joseph, L., 2101 Blaisdell Ave. Minneapolis, Minn.  
Oregon, Washington, Montana, Idaho—Burcham, Don, 382 Oak St., Portland, Oregon  
Eastern Pennsylvania, District of Columbia, New Jersey, including Trenton on South, Delaware, Maryland—Byrd, Ken, Terminal Commerce Bldg., 401 No. Broad St., Philadelphia, Pa.  
New England States, Upper New York State—Daw, Walter E., Room 401, 50 High St., Boston, Mass.

Illinois, Wisconsin—Cushing, L. G., 9 South Clinton St., Chicago, Ill.  
Atlanta, Georgia—Fowlkes, Sam. H., P. O. Box 42.  
Indiana—Gnas, John C., 415 Architects & Builders Bldg., Indianapolis.  
Northern California—Hermans, James P., 235 Ninth St., San Francisco, Calif.  
Cleveland, Ohio—Handel-Davies Co., Chester Twelfth Bldg.  
New York City—Smith, Howard F., 142 Liberty St., New York City.  
Southern Sellers: Louisiana, Mississippi, Alabama—J. E. Muniot, Jr., 918 Union St., New Orleans, La.  
Missouri—Beneke, J. W., 1689 Arcade Bldg., St. Louis.  
Canada—Continental Radio Corp., 79 Elm St., Toronto 2.

## Universal Microphone Co., Ltd.

Largest Exclusive Manufacturer of Microphones in the World  
1163 Hyde Park Blvd. Inglewood, Calif.

UNIVERSAL MICROPHONE CO., LTD.  
1163 Hyde Park Boulevard, Inglewood, Calif.

Ship me, C.O.D. at dealer's price, \_\_\_\_\_ Model \_\_\_\_\_  
Microphones. I enclose 50% deposit.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY AND STATE \_\_\_\_\_



# WHEN THE PENTODES ARRIVED

AS  
ANNOUNCED  
IN APRIL  
"RADIO"

## SUPREME WAS WAITING FOR THEM

**A**GAIN Supreme engineering vision and insurance against early obsolescence writes its record in radio servicing progress. When the SUPREME SET ANALYZER (known as Model 90) was introduced, it was prepared for the advent of the new pentode sets. The only Analyzer already provided with adequate meter ranges and switching facilities for all tube tests and circuit analytical indications of the new space charge (pentode) power amplifiers. When the pentodes arrived Supreme was waiting for them.



Dealers Net Price  
F.O.B. Greenwood, Miss.  
\$78.50

## YOUR OLD ANALYZER IS NOW USELESS UNLESS IT IS A SUPREME ANALYZER

**Y**OU can't service today's radio with yesterday's equipment. So when you buy an ANALYZER now to replace the one incapable of giving a modern, complete service, profit by the experience of more fortunate radio-men and INVEST in engineering foresight and leadership—choose the SUPREME ANALYZER, the instrument with one "wonder-meter," whose flexibility will prove astounding.



# AN ADVANCED OSCILLATOR, TOO



**S**ETS a new standard in oscillator design. Hundreds were glad to wait for the "Supreme" Oscillator (known as Model 70), placing orders in advance of delivery date, April 15th. The Radio World recognizes Supreme's reputation in Service Instruments—"SUPREME BY COMPARISON."

Both Oscillator and Output-Ohmmeter of advanced design. Model 70 covers intermediate frequency range from 90 K.C. to 550 K.C., and broadcast range of 550 to 1500 K.C. Operates from A.C. or D.C. 110 volt line or self-contained batteries. Completely shielded—tapered output control. Output meter of rectifier type is also provided with resistance measuring range of 0 ohms to 1 megohm. Keep pace with radio service progress—place your order today.

SUPREME DIAGNO-  
METER 400-B and SU-  
PREME TUBE CHECK-  
ER Model 19, are also  
adaptable for Pentode  
servicing. Write for in-  
structions.

Supreme Oscillator Model 70, Less  
Tube and Batteries, Dealers Net  
Price, F.O.B. Greenwood, Miss. **\$49.75**  
Supreme Output-Ohmmeter, Dealers  
Net Price, F.O.B. Greenwood, Miss. **\$30.00**  
Handsome carrying case of hardwood  
for combined Oscillator, Output-Ohm-  
meter, and Accessories. Dealers Net  
Price, F.O.B. Greenwood, Miss. **\$5.00**

## SUPREME INSTRUMENTS CORPORATION

405 SUPREME BLDG., GREENWOOD, MISS.

DISTRIBUTORS IN ALL PRINCIPAL CITIES

Service Depots in New York, Philadelphia, Chicago, Pittsburgh, Kansas City, San Francisco, Seattle, Toronto.  
Foreign Division: 130 West 42nd St., New York City. Cable Address: LOPREH, New York.

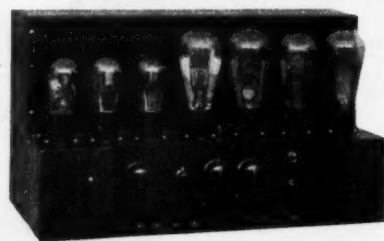
Tell them you saw it in RADIO



MEGA-COUSTIC

# AMPLIFIERS

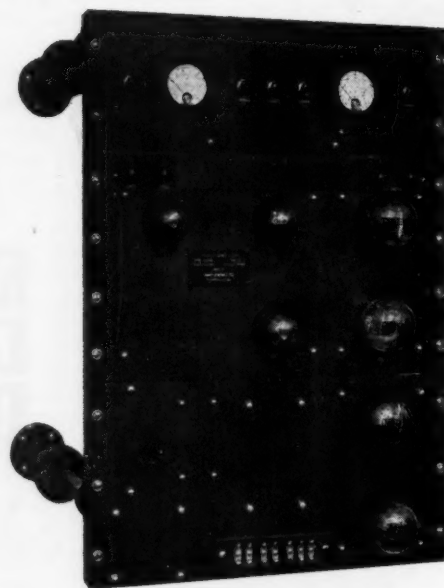
ARE GOOD AMPLIFIERS



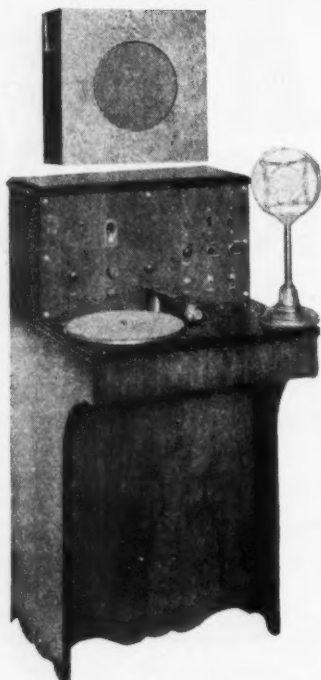
Type MC 250—12 watts, \$220.00



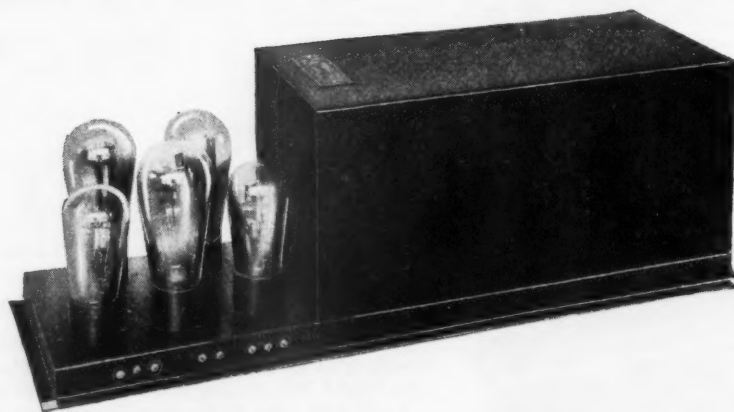
Type MC 866—25 watts, \$300.00



Theatre Type, TA 250—12 watts, \$375.00



Program-Reproducer  
Type MC 50—12 watts  
Type MC 66—25 watts



Type MC 245—4½ watts, \$100.00

**AMPLIFIERS, Ltd.** 7 FRONT STREET  
San Francisco, Calif., U.S. A.

Amplifiers Ltd., Dept. R.  
7 Front St., San Francisco, Calif., U. S. A.

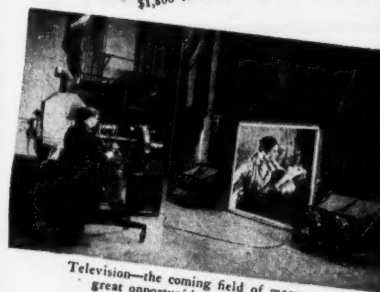
Send catalogs and dealers' discounts.

To \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



Broadcasting stations need trained men continually for jobs paying \$1,800 to \$3,000 a year.



Television—the coming field of many great opportunities—is covered by my course.



Operators on ships see the world and get good pay plus expenses.



Aviation is needing more and more trained Radio men. Operators employed through the Civil Service Commission earn \$2,000 to \$2,800 a year.



Talking Movies—an invention made possible only by Radio—offers many fine jobs to well trained Radio men.

# You'll Get Thrills-Adventure BIG PAY in RADIO



J. E. Smith, Pres.

**I will Train You at Home to Fill  
a Fascinating Job in Radio**

*Radio's Amazing Growth is Opening  
Hundreds of Big Jobs Every Year*

You like action, romance, thrills! You'll get them in Radio—plenty of them! Big pay, too. That is why I urge you to mail the coupon below for my free book of startling facts on the variety of fascinating, money-making opportunities in this great, uncrowded field. It also explains how you can quickly learn Radio through my amazingly simple 50-50 method of home-study training, even though you may not now know the difference between a "Screen Grid and a Gridiron". Thousands of men who knew absolutely nothing about Radio before taking my course are today making real money in this growing industry.

## Thrilling Jobs That Pay \$50 to \$100 a Week

Why go along with \$25, \$30 or \$45 a week in dull, no-future work when there are plenty of good jobs in Radio that pay \$50, \$75 and up to \$250 a week? For instance, by taking my training, you can see the world in grand style as a Radio operator on shipboard. There are many splendid openings in this line with good pay plus your expenses. You'll also find thrills and real pay in Aviation Radio work. Broadcasting is another field that offers big pay and fascinating opportunities to men who know Radio. And think of the great, thrilling future

for men with Radio training in Television and Talking Movies. My free book tells all about these and many other branches of Radio that bring you in contact with interesting people, pay big money and make life pleasant for you. Without doubt, Radio training is the key that opens the way to success. And my training, in particular, is the only training that makes you a "Certified RADIO-TRICIAN"—the magic words that mean valuable recognition for you in whatever type of Radio work you take up after graduation. You'll see why, when you receive my interesting book.

## Earn While You Learn

You don't have to quit your present job to take my course! You stay right at home, hold your job, and learn in your spare time. (Lack of high school education or Radio experience are no drawbacks.) I teach you to begin making money shortly after you enroll. My new practical method makes this possible. I give you eight big laboratory outfits that teach you to build and service practically every type of receiving set made. Many of my students earn \$15, \$20, \$30 weekly while learning. Earle Cummings, 18 Webster St., Haverhill, Mass., writes: "I made \$375 in one month in my spare time, installing, servicing, selling Radio sets." And let me emphasize right

here that a Radio business of your own is one of the money-making opportunities my training prepares you for in case you wish to settle down at home.

## Get My Free Book

Send the coupon below for my 64-page book of opportunities in Radio and information on my home-study training. It has put hundreds of fellows on the road to bigger pay and success. It will tell you exactly what Radio offers you, and how my Employment Department helps you get into Radio after you graduate. I back my training with a signed agreement to refund every penny of your money if, after completion, you are not satisfied with the Lesson and Instruction Service I give you. Fill in and mail the coupon NOW!

J. E. SMITH, Pres., Dept. 1EK4  
National Radio Institute,  
Washington, D. C.

**Act  
Now**



**Mail Coupon Today**

J. E. SMITH, President  
National Radio Institute, Dept. 1EK4  
Washington, D. C.

Dear Mr. Smith: Send me your book "Rich Rewards in Radio" giving information on the big-money opportunities in Radio and your famous 50-50 method of home-study training. I understand this places me under no obligation and that no salesman will call.

Name.....  
Address.....  
City..... State.....  
Occupation.....

## Travelled 75,000 Miles

"Dear Mr. Smith: I have worked as Junior Operator on board S. S. Dorchester and Chief Operator of the Chester Sun. I have travelled from 75,000 to 100,000 miles, visited ports in various countries, fished and motored with millionaires, been on airplane flights, etc. I am now with Broadcasting Station WREN." (Signed) Robin D. Compton, 1213 Vermont St., Lawrence, Kansas.



## \$400 a Month

"The Radio field is getting bigger and better every year. I have made more than \$400 each month and it really was your course that brought me to this." J. G. Dahlstead, 1484 So. 15th St., Salt Lake City, Utah.

**Employment Service to all Graduates**

Tell them you saw it in RADIO



# STEEL ANTENNA MASTS

## A Sideline That Builds Summer Profits

## Your Prospects Are Numerous...Everywhere

**\$1.50**  
**PER PAIR**

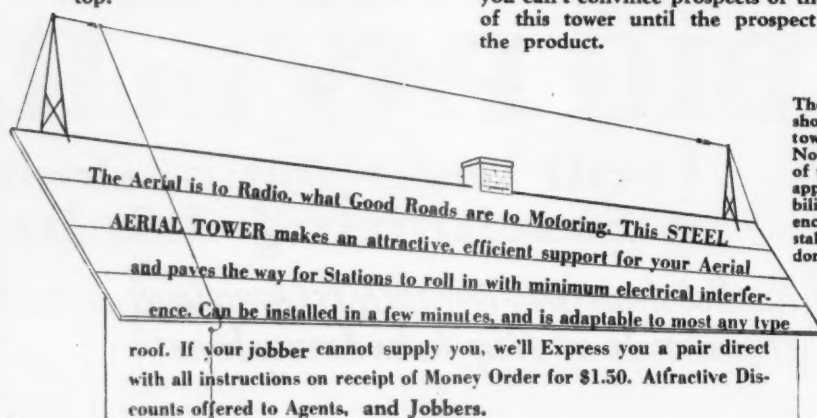
### *Better Antenna Installations Bring Better Business to You*

You can say what you want about side lines but the best side line for any radio merchant is ANTENNA INSTALLATIONS.

Every housetop needs an UP-TO-DATE aerial. Every aerial needs modern SUPPORT. There is no substitute for STEEL... especially when you can buy a PAIR of steel antenna towers for one dollar and fifty cents. These towers are five and a half feet tall and can be easily secured to any roof or house-top.

Send your service man on a trip through your city and let him show these miniature towers to every radio owner. You realize a PROFIT on the sale of the towers PLUS another profit from the installation. Every time you sell a radio set sell a pair of these towers. Their small cost makes them ready sellers. Everybody wants them when they see them. But you can't convince prospects of the merit of this tower until the prospect SEES the product.

5½ Feet  
HIGH  
18" Base  
Two Towers  
and two  
Insulators  
are packed  
in a neat  
carton.  
Can be  
shipped  
anywhere.



The illustration shows a pair of our towers installed. Note the neatness of the job... the appearance of stability and permanency. So easy to install that it can be done in short time.

## ORDER A PAIR AT ONCE

SEND THE COUPON AND YOUR CHECK TODAY

Get started . . NOW. \$1.50 brings you a pair of towers and two insulators. Or, better yet, put in a stock of a dozen pairs. The

total cost is only \$15.00 per dozen or \$12.50 for a carton containing 10 pairs. Shipments made same day your order reaches us.

### JOBBERS

Your dealers are buying these towers from us. Why don't YOU stock up right away and get your share of the profits? Wire or write for jobber proposition.

A. Lebourg  
602 South 11th St.,  
Gadsden, Alabama.

Ship \_\_\_\_\_ pairs of antenna  
towers for which I enclose \$ \_\_\_\_\_  
in payment. (Note—C. O. D. shipments  
accepted if 50% accompanies order).

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY AND STATE \_\_\_\_\_

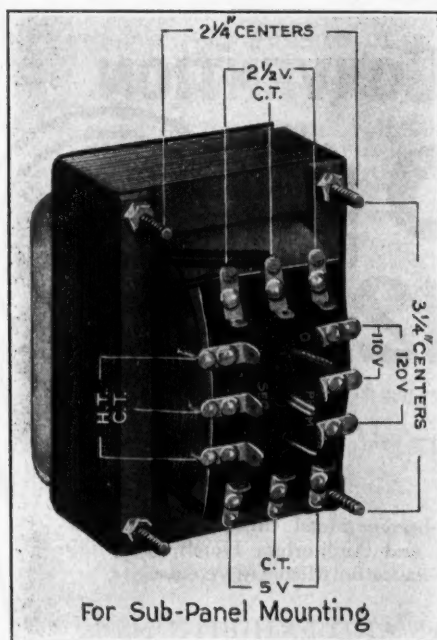
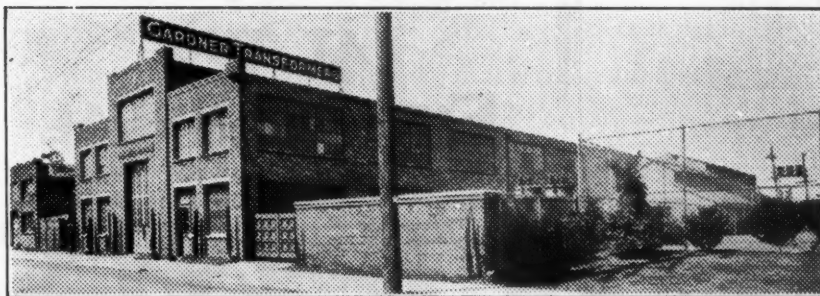
### AGENTS

Sales Agents please write for territory. Here is an article that SELLS. Get the facts — immediately.

# DEPENDABLE TRANSFORMERS

GARDNER ELECTRIC MFG. CO.

Emeryville, California



## Types of Transformers We Manufacture POWER PACK TRANSFORMERS

Terminal board plainly marked for set builders or for replacement purposes.  
Cat. No. 1612—800V ct 125 MA—5V-2A, 2 1/2 V ct-3A, 2 1/2 V-12A List price \$10.00  
Cat. No. 1588—800V ct 100 MA—5V-2A, 2 1/2 V-ct-3A, 2 1/2 V-12A List price \$ 9.00  
Cat. No. 1552—750V ct 80 MA—5V ct-2A, 2 1/2 V ct-2A, 2 1/2 V ct-7A List price \$ 7.00  
Furnished in half cover type as shown in figure at side, or with feet and clamps.  
Stock of left-over power transformers of 25 types of different sizes and voltages at bargain prices.

### AUDIO

Cat. No. A-1—1st stage List price \$3.00  
Cat. No. A-2—1st stage, high grade List price \$4.00  
Cat. No. A-3—Push Pull List price \$5.00  
Cat. No. A-4—Push Pull, pie wound balanced coils. Extra high grade List price \$7.50

### INPUT

Cat. No. 2710—Microphone one or two button to grid or line List price \$ 5.00  
Cat. No. 2447—Microphone one or two button to grid or line. Extra high grade List price \$ 8.00  
Cat. No. 3547—Microphone and Phonograph to grid List price \$10.00  
Cat. No. 227—Tube to line List price \$10.00  
Cat. No. 320—Line to line List price \$10.00  
Cat. No. P13—Photo-Electric Cell List price \$10.00  
Second grade of the above four List price \$ 6.00

### OUTPUT

Cat. No. 2514—Regular Tubes to Voice Coil List price \$ 5.00  
Cat. No. 2516—Two or four .50 Tubes to 1-2-3-4 Speakers List price \$10.00  
SPECIAL—Specify DC. MA and ohms impedance.

### FILAMENT

Cat. No. 2721—2 1/2 V-10A ct. List price \$5.00  
Cat. No. 2722—2-2 1/2 V-5A ct. List price \$6.00  
Any type made to your specifications at reasonable prices.

### AUTO

Cat. No. 75—75VA, 220 to 110 volts \$5.00  
Cat. No. 150—150VA, 220 to 110 volts \$7.50

### COILS AND CHOKES

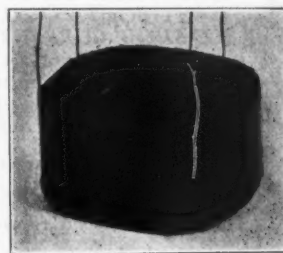
We manufacture coils and chokes for all purposes. Let us figure on your requirements. Our automatic winding machines are of our own design and second to none for quality work and compactness.

### MANUFACTURERS OF RADIO SETS AND PUBLIC ADDRESS SYSTEMS

We make to your order special transformers, coils and chokes of any size or requirements. Send us your specifications.

### SERVICE MEN

We stock and make to order a very complete line of transformers and coils for modern and obsolete radio sets and at reasonable prices.



## A GOOD SIDE LINE FOR DEALERS

The MOUNTAINAIRE is a compact ozone generator which quickly eliminates bad odors and makes the air in rooms sweet and fresh. Many find it almost indispensable for asthma, sinus trouble, hay-fever, colds, coughs, and insomnia. Sells for \$12.50, with a good PROFIT for the dealer.

*Agents Wanted — Please Write Us*

### TRANSFORMER STOCKS AT

SAN FRANCISCO—Frazar Co. Ltd., 7 Front Street

PORTLAND—Tru-Tone Products Co., 51 Security Bldg.

LOS ANGELES—C. E. Flynn

Tell them you saw it in RADIO

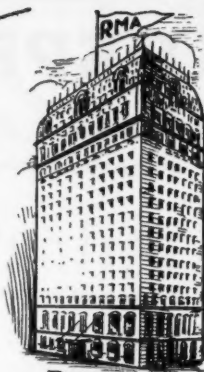




STEVENS HOTEL



**ANNOUNCING  
BUSINESS\$ FOR YOU  
AT THE  
FIFTH ANNUAL**



BLACKSTONE HOTEL

# **RMA Trade Show**

## **AND 7TH ANNUAL RMA CONVENTION**

# **CHICAGO**

## **JUNE 8 to 12th**



### **EVERYBODY WILL BE THERE**

Every branch of the radio industry will be at Chicago during the week of June 8th. This will be the largest gathering and biggest annual event of the industry.

Thirty thousand (30,000) square feet of radio exhibits in Grand Ball Room and Exhibition Hall of Stevens Hotel.

**ADMISSION TO THE TRADE ONLY. NO VACANT BOOTHS—ALL EXHIBITORS REQUIRED TO SHOW CURRENT MERCHANDISE.** The newest and latest receiving set models and accessories will be displayed and demonstrated at the show and in hotel demonstration rooms, for the trade to see what the manufacturers offer for the coming season.

25,000 radio manufacturers, jobbers and dealers expected to attend.

Reduced railroad rates—special trains.

Official hotels—Stevens Hotel (headquarters), Blackstone, Congress and Auditorium Hotels, all within short walking distance on Michigan Avenue.

### **INDUSTRIES AND EXHIBITIONS**

Radio industries, June 8-12—RMA, National Federation of Radio Associations and Radio Wholesalers Association.

Music Industry Convention and Show—June 15-17.

Institute of Radio Engineers Annual Convention—June 3-6.

Annual national "Furniture Mart" with 25,000 furniture buyers, jobbers, dealers and manufacturers—June 1-15.



CONGRESS HOTEL

Entertainment galore for visitors—Make a trip to Chicago for business and vacation combined.

Apply now direct to hotels for room reservations.

Invitation credentials for the trade show will be mailed to the trade about May 1st.

**RADIO MANUFACTURERS ASSOCIATION**

11-W. 42ND ST. N.Y. CITY

32 W. RANDOLPH ST. CHICAGO



AUDITORIUM HOTEL



# Radiotorial Comment

**T**HE time has come for the radio industry to stop complaining about hard times and to do something to improve conditions. In spite

**BROADCASTERS  
MUST SELL  
THEIR WARES** of the acute financial depression of eight and nine years ago, radio ran against the tide and was prosperous chiefly be-

cause it provided something new that the people wanted. Then it had little to offer except the lure of vicarious presence at far-distant places and the marvel of the means for satisfying this innate human desire. Today, though it provides the finest means of entertainment and instruction in the home, it has become as commonplace as a sewing-machine. The public wants some new thrill for which to spend its dollars.

Even without the promise of television, radio is still capable of providing that thrill. Daily there is something on the air from which any listener can get a "kick"—if he only realized it. Yet there are literally millions of radio sets which are silent as a tomb night after night. Radio does not advertise itself enough, nor is it any longer advertised by its loving friends.

The fault rests primarily with the broadcast stations. For years they have become so accustomed to being helped, whether by the unpaid radio artist in the early days, the subsidies from the trade associations, or the free boosts from the newspapers, that they do not seem to know how to help themselves.

The newspapers in particular feel that the broadcasters have bitten the hand that fed them. The American Newspaper Association claims that broadcasting has not only diverted 28 million dollars a year from newspaper and magazine advertising, but is also encroaching upon the news and editorial services rendered

by the press. Consequently it is proposed that the newspapers cease to publish the daily summary of radio programs.

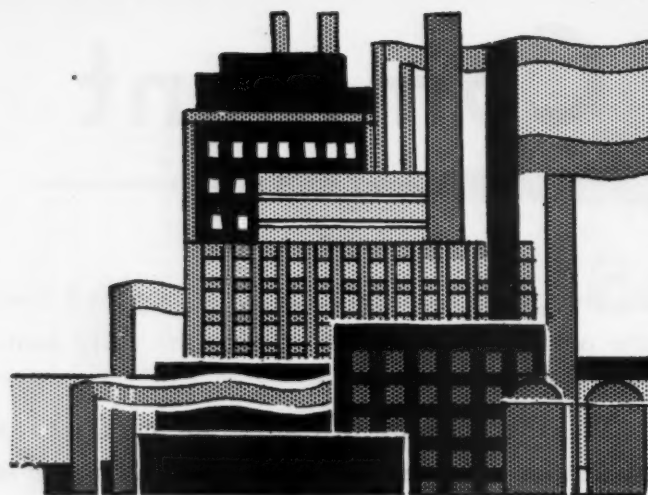
Whether or not this proposal comes to a head, the sensible action for the broadcaster is to advertise his program as does the theater. Any newspaper advertising such as that done by the program sponsor could be supplemented by that of the broadcaster, especially in the case of sustaining programs. Thereby it will be possible to build up the audience which he is losing by default of proper selling.

In short, since radio no longer sells itself, energetic advertising and effective distribution must be provided to sell it.

● ● ●  
"It has been found," says an advertising expert, "that the average bankrupt keeps no books, pays too much rent and buys more on credit than he can turn over at a profit. Seventy-five per cent of failures have never taken an inventory of stock."

## TIME TO CHECK UP

●  
One thing that the business depression has done for us is to call attention to the weaknesses and defects in the handling of our business. Many radio dealers have gone to the wall during the past two years, and the reasons that have been passed out to their friends are that they couldn't stand the ruthless competition, the country was broke, or midgets had wrecked their profits. While times were good our businesses ran themselves. When times get bad those who are first to go are those who haven't bothered with systematic guarding of their capital. Management of a retail business is just as much a science as conducting an advertising campaign. It requires a whole lot more than luring prospects into the store and extracting a down payment.



# The Trend of

## What's This 100%

### Replacement?

**D**UE to the fact that as far as the average dealer can tell, (unless experience has taught him otherwise), one radio tube is as good as another, many tube salesmen have resorted to tales of their companies' "unusual" policy. What is unusual about it is that the manufacturer has what is known as a 100% replacement policy. And what is of more striking significance, the dealer often falls for it.

It doesn't take very much reasoning to determine why such a thing as a 100% replacement policy would ruin the tube industry, as far as replacements are concerned, both for the manufacturer and for the dealer, himself. If a radio dealer could assure his customers that he would replace tubes free without question he should drive to work behind a team of reindeer. The term 100% replacement policy leads one to believe that there would be no questioning as to what caused the tube to pass out or how long it had given service. It has been worked to death, even though it never meant anything in the first place. The leaders in the industry feel that it is now time to substitute a term that means something; perhaps go back to the old fashioned "This tube is guaranteed for 30 (60) (90) (take your choice) days against defect in manufacture." If any blame for the tube's failure can be laid upon the set owner, such as high line voltage or improper handling of the tube, the dealer has a right to refuse replacement and attempt to sell another tube, even though a careless jobber or manufacturer is known to be willing to make a replacement. If the dealer believes a free replacement will gain him goodwill that will be worth more to him later that is his responsibility and, it seems logical at least, the price of the replaced tube should come out of his own advertising budget. If the tube manufacturer is willing to help him gain this goodwill so much the better,

but the dealer should be honest about it. In the past the manufacturer has been taken advantage of to some extent, although it was probably due to his own carelessness and desire for more business that put him in that position.

□ ● □

## Radio Becomes a Public

### Utility

**I**N a recent interview Judge Ira E. Robinson, Federal Radio Commissioner, states that radio advertisers who "talk shop" over the air not only are "exceedingly impolite, but to most people disgusting." He's right. "Radio is a public utility," he goes on to say, "open to free speech—belonging to all and not to the few." If he's right about this, radio is the first public utility that has not taken occasion to remind us citizens, on the first of each and every month, of its services to us; the reminder coming in an envelope with a window in front.

No, in this respect radio is not a public utility because the public does not support it. Hasty figures (we have not bothered to take a "survey") show that the money spent annually on electric current to run our radio sets alone amounts to something like fifty million dollars. If the public utilities that supply this current would offer to divide this income with the broadcasters we could have bigger and better programs than we have now, and without benefit of sponsors. But it might be a task and a half to convince the electrical utilities that such generosity would pay for itself in the long run. *There's* a job that would keep the Radio Commission occupied, and in which it would get the undivided support of the radio industry and the public. However, that job has its problems.

Judge Robinson tells the truth, though, when he makes the remark that the way some advertisers "talk shop" is disgusting. It is hurting the radio business; worse than that, it is hampering radio in its calling, as a propagator of the fine arts.

It certainly looks as if the radio trade should take the lead in making war on forces which tend to tear down that which our industry has been attempting to build up. And the best way to do it is to write to the offending radio advertisers, expressing the opinion that their advertising is doing more harm than good.

□ ● □

## The Summer Slump Is a Heritage

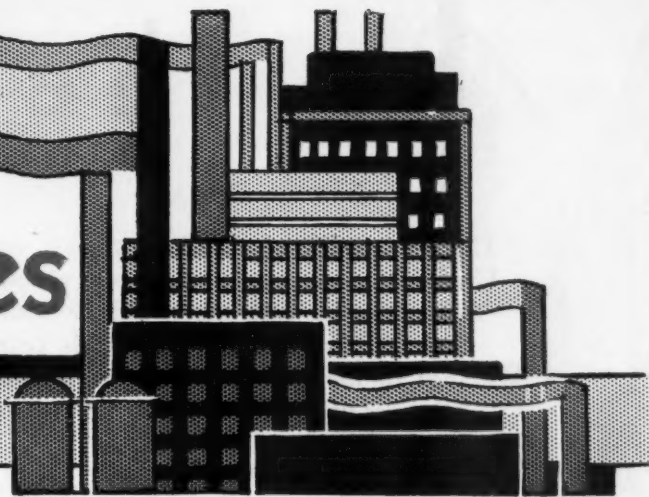
**A**LTHOUGH the radio business is still young it already seems to have developed some traditions. One is the summer slump. In the days of DX and hot weather static there was reason for a summer slump, but not today.

About the only possible reasons that can be conjured up to explain the summer slump in this day and age are, first that people don't feel like buying when the weather is hot. Whoever thought this up was sorely in need of an explanation for something. Second, it is said that people spend their time in warm weather taking drives out into the country and vacationing. They can't drive all the time, nor can many of us vacation all the time. When we do we take our radios along.

A very interesting booklet published by the Columbia Broadcasting System to show that radio broadcasting is a medium for summer advertising has some facts that prove definitely that radio is used in the summer. If it is used it can be sold. According to a chart showing the monthly variations in audience mail July and August are both above average, while March, April, May and June are down just a little. The monthly variation in audience mail on a single non-commercial program which made the same offer (for a booklet) during the period of January to October, shows that July is the leading month with May second and August third. While July leads, June brings up the rear, giving the "summer slump enthusiasts" one bone to gnaw on.



# The Radio Times



And yet the summer slump is still with us, more as a topic for conversation than as a factor in business depression. Psychologists say that the recognition of an imaginary evil will allow it to do as much harm as if it were real and in the flesh.

## Sound Competition Keen

RADIO dealers who are handling sound equipment are bemoaning the fact that competition in their line is of the worst type ever known to man. And a survey of the situation more or less justifies their complaints. The editor attended a baseball game the other day in one of the finest ball parks ever built. 25,000 people were there. The seats had comfortable backs and arms. An electric scoreboard identified each player as he went to bat. The park was surrounded by immense steel masts, each topped with a battery of searchlights that must have cost a small fortune. And out in back of center field a dozen or so long horns, with red, white and blue stripes around their bells announced to the baseball loving throng that the Standard Oil Company had relieved the municipal authorities of the expense of putting in a public address system.

The city paid cash for the lights, the masts, the seats, the concrete that holds them up, the turf; everything but the public address system. That was a gift. In comparison to the money spent on the other parts of the park it was the cheapest gift that could have been accepted. A complete installation wouldn't have cost any more than a season's supply of electric light bulbs. But it was a gift. The city and the public appreciate it.

It is an expensive installation, as far as such matters go, and it is operated efficiently and has lots of power. The public didn't object to the four announcements "of interest to automobile owners," either. It has been taught by the radio that those things are but just compensation for the services rendered.

Now who is at fault for allowing the Standard Oil Company to cheat the

radio dealer out of a good job? Who but the dealer? He had three or four arguments in his favor that should have been unbeatable. He could have put in a job that would have had all the merits of that of the oil company; he could have argued that the cost would have been a drop in the bucket as compared to the complete outlay; he could have pointed out advantages of eliminating the advertising announcements; and perhaps he could have convinced the Chamber of Commerce that the city should support its private industries by opening the bids to its radio dealers.

This baseball park illustration is just one of many instances in which large concerns are taking public address business away from radio dealers by loaning their equipment gratis to those who would otherwise be prospects for rentals or for sales. To be sure, one dealer probably got the job of putting the equipment together for the "public spirited" company, although many of these companies are buying their apparatus direct and assembling it themselves. And with it they will cover every event, to the exclusion of the man who counts upon this business for his livelihood.

## Good News for the Short Wave Broadcast Listener

NOT many years ago, when it was first conceived that radio would have some commercial application, the transmitting amateur was driven out of the long waves then in use and corralled below 200 meters. Making the best of his loss he soon showed that the short waves had greater inherent possibilities than the long waves, whereupon the powers that be cut in upon this wide band of frequencies they had passed off onto the amateur and left the latter with a few ribs of what had formerly been his turkey carcass. During the last couple of years the wave-lengths under 100 meters have become so important for trans-oceanic commercial and governmental communication, for ship to shore

traffic, for aeronautical communication and directional systems, that those of us who are in the game for entertainment purposes are finding ourselves crowded out a little more each month.

Good news is in store, though, for the transmitting amateurs and for the short wave broadcast listeners, especially the latter. Extensive experiments recently made by the International Telephone and Telegraph Laboratories, in cooperation with the Laboratories of Le Matériel Téléphonique, of Paris, have shown it possible to transmit messages on a wave length of 10 centimeters, *one tenth of one meter*. In fact these Micro-Rays, as they are called, show no tendency to fade or are they otherwise subject to the limitations of longer wave lengths. They are extremely directional; shot out like a beam of light and just as suitable to telephone transmission as to telegraph.

What does it mean? It means that they will eventually be used for ship and aircraft compass work, transcontinental and transoceanic telegraphic and telephonic communication, governmental secret transmissions, in short, everything that is now handled on the so-called short waves of from 10 to 100 meters. Everything, that is, except short wave broadcasting and television. These two services, and possibly a percentage of the amateur work, will be left on their present frequencies because they have to be sent in all directions at once. But to remove all the commercials and governmentals off the 10 to 100 meter band will open it wide to broadcasting and television. While it is now next to impossible to obtain a broadcasting license on short waves, the advent of the Micro-Rays will eventually allow the Federal Radio Commission to fill out these bands with good broadcast stations. That will greatly increase the demand for short wave receivers. Possibly the receiver of 1932 or 1933 will be capable of playing everything from 10 to 550 meters. There are several such receivers on the market now, at least one of which operates without the necessity of changing coils.





# Is the Census

By P. S. LUCAS

"The average life of a radio set," says the United States census report, "is four years."

If that is the case there will be some three million sets to replace this year, not to mention the fourteen million homes yet to be sold their first radio.

**L**OOKING over the fine examples of radio merchandise now showing in the better class radio store one is very much inclined to show skepticism about the recent census report which states that the average life of a radio receiver is but four years. It is readily acknowledged that *heretofore* four years has been a good long life (taken as an average) for a radio set. But the radio set of 1931, will it not be capable of as good reproduction four years from now as it is today? Yes, without a doubt it will. For that matter the radio set of 1921, with a new tube and a new set of batteries, is capable of giving as good or better results than it did when in its prime, providing, of course, that it has not been mistreated.

That, however, is not the question. What makes a radio set obsolete is not its inability to perform but the fact that the attainments of the industry improve year by year. This happens in two ways; later models of radio receivers are bettered in design and performance, and broadcasting, itself, improves to an extent far beyond the capabilities of the earlier model receivers to reproduce. The combination of these two has developed a more critical ear on the part of the public.

Four years ago the latest radio receivers were considered the last word in radio. It is hard to remember our reactions to them at that time but very likely they were considered the ultimate, beyond which there was very little chance to improve. And yet we now laugh to recall that that was 1927, the year in which the a-c tube was introduced, when '26 type tubes were used in all stages except the detector and last audio stage, which took a '27 and a '71-A, respectively. Is it not just as possible that what we consider the last word in radio receivers today will give rise to as much mirth in 1935? Just as a matter of interest let us look back over the years and enumerate the changes made in the industry since radio first began to take the public eye, or ear.

1920

The amateurs ruled the roost. They were beginning to use vacuum tube receivers and talking about tube transmitters. Electrical dealers were beginning to stock radio parts but there were few if any exclusively radio stores.

1921

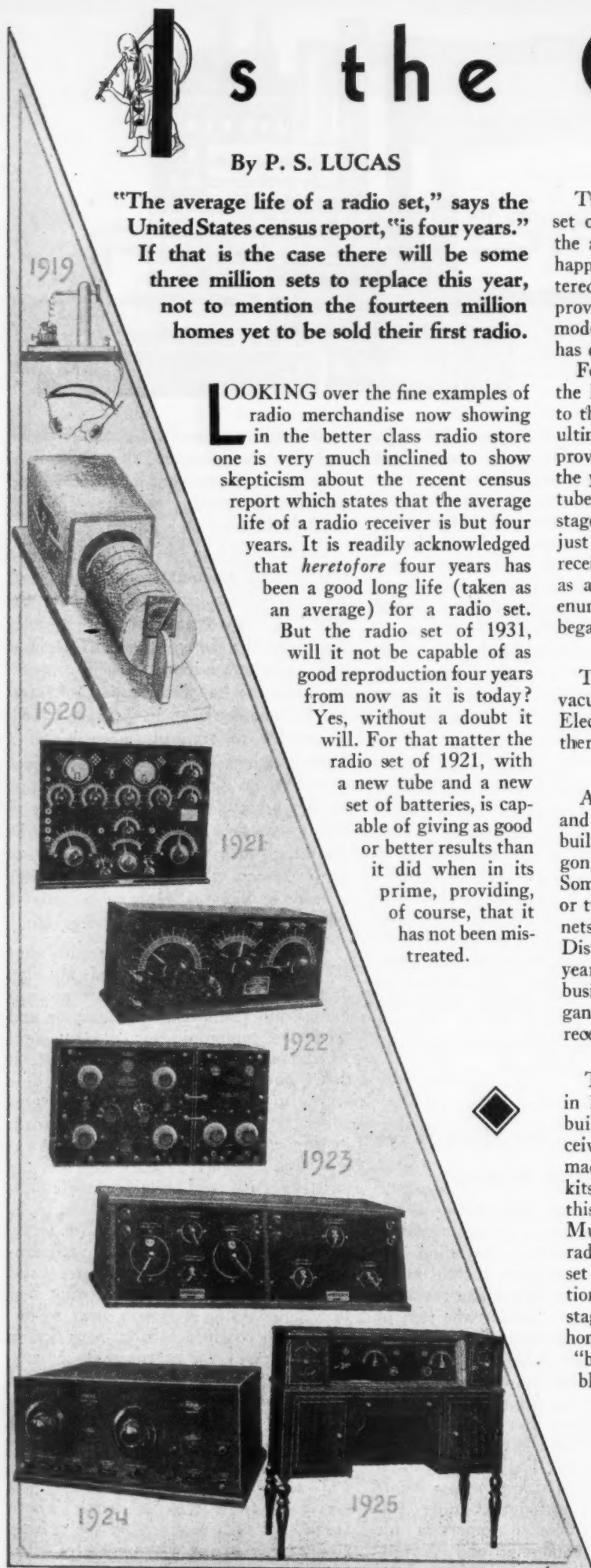
A few men and a lot of boys began to get broadcast minded, and to build their own receivers. There were several factory built receivers on the market, however, including Grebe, Paragon, and quite a few others without national distribution. Some of them incorporated a single tube while others had one or two stages of a-f amplification. All were built in plain cabinets with a panel all over the front; switches and dials galore. Distribution was largely obtained by mail order, although this year saw the influx of thousands of retail outfits in the radio business. Hardware stores, drug stores and cigar stands began to stock everything from galena crystals to complete receivers.

1922

The primary advance in the popularity of radio reception in 1922 was in the response to broadcast. Many new factory built receivers began to make their appearance. The unit receiver, consisting of from two to fifteen similarly shaped units, made an attempt to capture public approval, and the first radio kits were offered. Radio frequency amplification dates from this period, among the first sets of this type being the Ware, Mu-Rad and Federal of Buffao. The little flat Mu-Rad radio frequency transformer caused quite a commotion among set builders, whose first introduction to this type of amplification gave them quite a bit to worry about. A detector and three stages of audio frequency amplification was a radio to write home about. Atwater Kent came out with its first set on a "breadboard" during 1922, which was more or less responsible for bringing the prices down to more reasonable figures.

1923

In 1923 the big rush on the parts business commenced. It was still perfectly feasible to expect a man handy with tools to make a set look and work just as good as a factory built model. The latter were all built for table mounting, featuring the panel, with no regard for cabinet. Parts stores were springing up all over the country; some of them doing a very sizeable



# Wrong?

business. In the summer of this year the portable receiver made its first appearance of any note, and several manufacturers, including Colin B. Kennedy, introduced small, compact sets for vacationing purposes. Just too late for the summer portable business RCA and Cunningham brought out their '99 tubes, which began to appear in factory sets before the year was over. Phonograph adapters were invented; not the kind that played phonograph music through an amplifier and loudspeaker but the kind that played radio music through the phonograph horn. The Hazeltine Neutrodyne was introduced and immediately won favor as a distance getter. Most of the radio stores, dealing mainly in parts, were getting most of their business in the form of complete sets that they built up themselves. The majority of exclusively radio dealers, in other words, were also "kitchen sink" manufacturers, building receivers on special order or standardizing on one or more regular models and displaying a couple in their windows.

## 1924

The public began to get cabinet conscious early in 1924, and manufacturers started to build some furniture around their receivers. In January RCA brought out the Radiola Grand, built in a cabinet along the lines of the old fashioned phonograph, with the receiver mounted in the place for the phonograph turntable. Then followed the Radiola Super VIII, combining the first marketed superheterodyne and a new style of cabinet, very awkward as we look back upon it, but unique in that the panel was mounted vertically, on front, with a shelf to hide it. This was the signal for many types of console receivers, but most of the cabinets retained their phonograph appearance. Grebe moved a step ahead by bringing out its famous Synchrophase, in which the usual disc dial had been replaced with a horizontally mounted knurled wheel which just protruded through the panel. These were surrounded by bronze escutcheon plates, which also added class to the set's appearance. Set builders went wild over the superheterodyne, and anybody who couldn't hear stations from across the country were out of the picture. So-called "bootleg" tube manufacturers began to spring up and fade out over night, causing the patent holders much annoyance and giving the set builders a great deal of amusement.

## 1925

This was a big year for the parts manufacturers and dealers who sold parts and built up receivers for sale, especially superheterodynes. Several of the old time manufacturers went after the broadcast listeners' business in a big way. Zenith left off with building amateur apparatus and put out some very expensive console models. Appearance of receivers was improved during 1925 but slightly, while performance underwent some revolutionary changes. This year marks the introduction of the Raytheon B eliminator tube, and the advent of many manufacturers into the socket power appliance field.

## 1926

The distance craze was still on. The parts manufacturers were monopolizing most of the magazines. Complete kits were sold in abundance but the sales of factory built receivers were below what they had been in former years. It was a day of pride in one's own ability to construct a radio set, and those who listened to "boughten receivers" were not afforded the same respect as those who had "rolled their own."

## 1927

Parts, chargers, B eliminators, ganged condensers and cabinets. Single control was becoming, for the first time, more or less feasible. Cabinets became an important part of the radio dealer's business. The first '26 and '27 tubes sneaked into the

market with a bit of hesitation as to how they would be accepted, and RCA came out with the Radiola 16 and 17, which began the biggest revolution the industry had known.

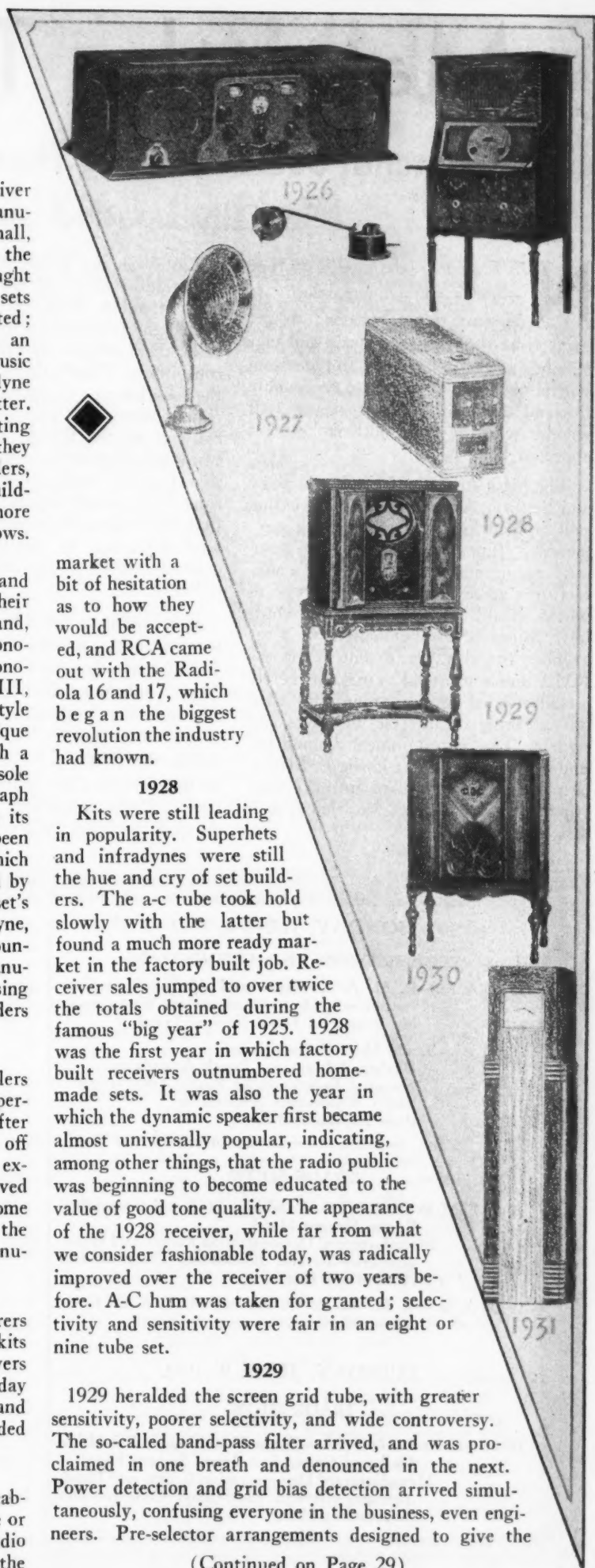
## 1928

Kits were still leading in popularity. Superhets and infradynes were still the hue and cry of set builders. The a-c tube took hold slowly with the latter but found a much more ready market in the factory built job. Receiver sales jumped to over twice the totals obtained during the famous "big year" of 1925. 1928 was the first year in which factory built receivers outnumbered home-made sets. It was also the year in which the dynamic speaker first became almost universally popular, indicating, among other things, that the radio public was beginning to become educated to the value of good tone quality. The appearance of the 1928 receiver, while far from what we consider fashionable today, was radically improved over the receiver of two years before. A-C hum was taken for granted; selectivity and sensitivity were fair in an eight or nine tube set.

## 1929

1929 heralded the screen grid tube, with greater sensitivity, poorer selectivity, and wide controversy. The so-called band-pass filter arrived, and was proclaimed in one breath and denounced in the next. Power detection and grid bias detection arrived simultaneously, confusing everyone in the business, even engineers. Pre-selector arrangements designed to give the

(Continued on Page 29)





# Make the Trade Show

Attend! See Everything There Is to See. Hear Everything  
Mentally Loaded and Morally Charged to Make

**N**EXT month—the month of June—brings you an opportunity to do two things in one; to get away from the stress and strain and take a long needed vacation, and to join with a gathering that will so thoroughly fire you with enthusiasm that you will wonder why the radio outlook has ever appeared blue.

The Fifth Annual RMA Trade Show and Seventh Annual RMA Convention will be held in Chicago, the week commencing June 8th. Twenty-five thousand radio retailers, jobbers and manufacturers are expected to attend, one of whom should be none other than yourself. "Business without ballyhoo" is the keynote for this year's show; but the RMA does not intend to make it merely a cold blooded business proposition without anything of interest but facts and figures. The entertainment committee, under the leadership of Leslie F. Muter, is making extensive plans to make your trip a pleasurable one; a vacation as well as a business trip.

Last year the Trade Show was held in Atlantic City. 32,000 radio tradesmen attended. This year, the Stevens Hotel, the largest hotel in the world, is to be the headquarters for the show and convention. Three other Chicago hotels, the Blackstone, Congress and Auditorium hotels, have also been put under contract by the RMA, and more than two hundred manufacturers have already signed up for booths in which to exhibit their latest merchandise. It is expected that this will again be the largest industrial gathering in the United States; quite a feather in the cap of the radio industry.

In addition to the RMA events, visitors will be drawn to Chicago early next June for the Annual Convention of the Music Industry, which meets June 15-17, immediately following the RMA Trade Show and Convention. Just preceding the RMA radio week there will be the Annual Convention of the Institute of Radio Engineers, June 3-6. The Annual National "Furniture Mart" is

also to be held in Chicago, June 1-15. Also there will be the national gathering during RMA week of affiliated radio industry organizations, including the National Federation of Radio Associations and the Radio Wholesalers Association. All of these will lend themselves to make the RMA Trade Show more attractive.

The planning of the Trade Show is in the charge of the RMA Show Committee, headed by Major H. H. Frost, of New York, Chairman, former president of the RMA. The Seventh Annual Convention of the Association is in the charge of Mr. Leslie F. Muter, of Chicago, Chairman of the Convention and Entertainment Committee. The Trade Show is under the immediate direction of Bond Geddes, Executive Vice-President of the RMA, with the assistance of Executive Secretary M. F. Flanagan, the latter having immediate direction of the convention arrangements.

The Show will be held in the Grand Ball Room and Exhibition Hall of the

## MONDAY, JUNE 8, 1931

### REGISTRATION AND CREDENTIALS

10:00 A. M.—R. M. A. Delegates and Alternates to Convention—R. M. A. Headquarters, West Assembly Room, 3d Floor, Stevens Hotel.

Trade Show Registrations—  
Dealers, Jobbers and Booth Attendants  
National Federation of Radio Associations  
Radio Wholesalers Association  
Press Representatives  
—Lower Lobby, Stevens Hotel.

### TRADE SHOW

2:00 P. M. to 10:00 P. M.—Exhibition Hall and Grand Ball Room, Stevens Hotel.  
Manufacturers' Demonstration Rooms and Headquarters—Stevens, Blackstone, Congress and Auditorium Hotels.

10:00 A. M.—R. M. A., R. W. A., and N. F. R. A. Committee Meetings.

## TUESDAY, JUNE 9, 1931

### TRADE SHOW

10:00 A. M. to 10:00 P. M.—Trade Show Hours—Exhibition Hall and Grand Ball Room, Stevens Hotel.  
Manufacturers' Demonstration Rooms and Headquarters—Stevens, Blackstone, Congress and Auditorium Hotels.

## MEETINGS

### Radio Manufacturers Association

10:30 A. M.—Joint Open Meeting, Radio Industries—North Ball Room, 3d Floor, Stevens Hotel.  
(All dealers, jobbers and other industry representatives invited.)

Presiding, Morris Metcalf, President, R. M. A.  
"Welcome to Radio Industries," His Honor, Mayor A. J. Cermak of Chicago.

Other Addresses.

12:30 P. M.—Joint Luncheon Meeting, Boards of Directors of the R. M. A., N. F. R. A., R. W. A., I. R. E., N. A. B. and Music Industries—North Assembly Room, 3d Floor, Stevens Hotel.

### National Federation of Radio Associations, Radio Wholesalers Association

10:30 A. M.—Joint Open Meeting, Radio Industries—North Ball Room, 3d Floor, Stevens Hotel. (All dealers, jobbers and other industry representatives invited.)

2:00 P. M.—N. F. R. A. Committees—Private Dining Rooms, 3d Floor, Stevens Hotel.

7:00 P. M.—Annual Banquet, National Association of Music Merchants—Grand Ball Room, Palmer House. (All members of radio industry invited.)



# Profitable to YOU!

There Is to Hear. Enjoy Yourself. And Go Back Home  
1931-1932 the Hottest Year You Ever Had!

Stevens Hotel, with a total of 30,000 square feet of exhibiting space. The very latest in modern radio will be on exhibition and there will be no vacant booths. Admission to the Trade Show, as usual, will be limited to the trade only. The newest in radio receiving sets, tubes, loud speakers, parts, cabinets, accessories and allied lines that are manufactured by members of the RMA will be shown. And there will be an unusually large number of new circuit designs to be shown.

A trade show is the only possible means by which a radio dealer can get a complete, comprehensive idea of everything the radio industry has to offer the public. There you will learn what the manufacturers intend to do with the new screen grid tube, and the pentode. There you will be able to see for yourself just how much you can depend upon the rumors that have been going the rounds. All the new developments in the business will be exhibited and talked about for your edification. You will come home knowing just what to expect

of automobile radio during the coming season. Motorboat radio sets will be on display. Television will be strutting its stuff, enough, at least, so that you will know what to look for along that line during the next few months.

Perhaps more important to the dealer who is on the lookout for better times ahead are the possibilities that come from mingling with other dealers from all parts of the country, and with manufacturers and jobbers. The interchange of merchandising ideas is one of the most valuable factors in modern business. Getting the manufacturer's viewpoint is another.

And don't forget the vacation. The committee promises the best that can be offered along the line of enjoyment. Instead of the usual RMA banquet, Chairman Muter is arranging a novel entertainment for the radio throng that has never been excelled. There will be a big "radio party," a stag affair, with appropriate entertainment, on Wednesday evening, June 10th. The various manufac-

turers are expected to hold luncheons, dinners, theatre parties, etc., for their radio guests during the entire week. And all of the varied summer entertainments at Chicago in the vicinity of Lake Michigan will be in full swing at the time of the convention, giving the visitors an opportunity to toss care and worry to the winds.

And so you radio dealers who can stage a getaway from your businesses will find it greatly to your profit if you can take in the Trade Show. It isn't so much a matter of what you learn about new lines that are to make their appearance; the entire benefit will not be based on the contacts you make; the greatest good will come from mixing business and pleasure for a week. After a strenuous season of rough-shod competition, meager profits, and a slack market you will find that the Trade Show and Convention will give you a new lease on life. You will be able to come back and start your new fiscal year with your eyes turned ahead instead of behind you.

## WEDNESDAY, JUNE 10, 1931

### TRADE SHOW

1:00 P. M. to 8:00 P. M.—Trade Show Hours—Exhibition Hall and Grand Ball Room, Stevens Hotel.  
Manufacturers' Demonstration Rooms and Headquarters—Stevens, Blackstone, Congress and Auditorium Hotels.  
(The Trade Show will be closed on Wednesday, June 10, at 8:00 P. M. because of the R. M. A. "Stag Party" at 10:00 P. M. in the Eighth Street Theatre, immediately adjoining the Stevens Hotel.)

### MEETINGS

Radio Manufacturers Association  
10:00 A. M.—R. M. A. Closed Membership Meeting (Delegates and Alternates only)—North Ball Room, 3d Floor, Stevens Hotel.  
(All Delegates and Alternates must attend; \$50 forfeiture for FAILURE of Exhibitor's Delegate or Alternate to Attend.)  
Presiding, Morris Metcalf, President, R. M. A.  
10:00 P. M.—R. M. A. "Stag Party"—Eighth Street Theatre, immediately adjoining Stevens Hotel.

### MEETINGS

Other Radio Organizations  
10:00 A. M.—Radio Wholesalers Association, Closed Membership Meeting—South Ball Room, 3d Floor, Stevens Hotel.  
Presiding, Louis Buehn, President, R. W. A.  
10:00 A. M.—Newspaper Radio Editors Association—Private Dining Room No. 2, 3d Floor, Stevens Hotel.  
Presiding, Volney D. Hurd of Boston, President.  
Addresses and Discussions.

3:00 P. M.—Radio Press Association—Private Dining Room No. 5, 3d Floor, Stevens Hotel.  
Presiding, H. H. Cory of Minneapolis, President.  
Addresses and Discussions.

## THURSDAY, JUNE 11, 1931

### TRADE SHOW

1:00 P. M. to 10:00 P. M.—Trade Show Hours—Exhibition Hall and Grand Ball Room, Stevens Hotel.  
Manufacturers' Demonstration Rooms and Headquarters—Stevens, Blackstone, Congress and Auditorium Hotels.

### MEETINGS

Radio Manufacturers Association  
10:00 A. M.—R. M. A. Closed Membership Meeting (Delegates and Alternates Only)—North Ball Room, 3d Floor, Stevens Hotel.  
(All Delegates and Alternates must attend; \$50 forfeiture for FAILURE of Exhibitor's Delegate or alternate to attend.)  
Presiding, Morris Metcalf, President, R. M. A.  
10:00 A. M.—Meeting Radio Retailers—South Ball Room, 3d Floor, Stevens Hotel.  
Presiding, Jas. Aitken, President, N. F. R. A.

## FRIDAY, JUNE 12, 1931

### TRADE SHOW

10:00 A. M. to 10:00 P. M.—Trade Show Hours—Exhibition Hall and Grand Ball Room, Stevens Hotel.  
Manufacturers' Demonstration Rooms and Headquarters—Stevens, Blackstone, Congress and Auditorium Hotels.

### MEETINGS

Radio Manufacturers Association  
10:00 A. M.—R. M. A. Board of Directors—Private Dining Room No. 1, 3d Floor, Stevens Hotel.

# Sensible Selection of Sound Equipment

By W. P. BRUSH

**B**EYOND the possibility of a doubt the most common cause of unsatisfactory results from group address installation has been the selection of material. Not that the material has not always been anything but the best, but that it has not been chosen with regard to its ability to match up with associated equipment. A speaker, for instance, may have seemed far superior in reproduction when tested against several other makes, *on a certain radio set*, but the deficiencies in the audio system of that set may have happened to dovetail with those of the selected speaker, producing a very pleasing response, while the same speaker, if used with a more perfect power amplifier, might have had a distressing over accentuation of some portion of the musical range. It would therefore seem only logical that speakers should be tried with the amplifiers with which they are to work. The opposite also holds true.

To illustrate this point further, there are on the market two well known makes of large dynamic type speakers, one of which is capable of very brilliant reproduction of the upper register, while the other gives a fuller reproduction of the lower notes, with a decided falling off in ability to handle the highs. The identical condition exists also in the characteristics of one model of each of two well known amplifiers. Both speakers and both amplifiers may be considered very good equipment. Now assuming the selection of the amplifier favoring the upper range, to work with the speaker of the same characteristics, the resultant reproduction will be of a shrill, unpleasant character; and if the other speaker and amplifier, both favoring the low notes, at the sacrifice of the upper register, were used together, the reproduction would be tubby, barrelly, making speech unintelligible, a violin sound like a 'cello, a tenor like a baritone. Those would be cases of good equipment unwisely chosen.

To be sure there are now commercially available, tone control devices for suppressing those portions of the audible scale that are over prominent, and they are invaluable for altering the reproduction on a system to conform with severe acoustical conditions of both extremes, frequently met with in auditoriums, rinks, theatres, and other enclosures. In the original selection of the material to be used, however, it should be ascertained that a reasonably uniform amplitude of highs, lows and middle register are being reproduced by the complete system, without attenuating any portion. In the case of the above two illustrations if the objectionable portion of the range were subdued with a tone control there would be very little but middle register left, as no commercial device for external connection can build up frequency groups that the amplifier, or speaker, or both, are not able to reproduce.

In tests to determine material to be standardized on, the ear is the best and final judge, as far as reproduction goes, as it is the *apparent* perfection of reproduction, including the known inaccuracies of the human ear, that we are interested in, and



not necessarily perfect reproduction from the standpoint of engineering of the units comprising the system. In making tests, where possible, a room or other enclosure should be used that has not an abnormal amount of sound absorptive material, such as acoustical deadening material. Such treatment can be, and sometimes is, carried to a point where the higher frequencies have to be over accentuated to produce normal reproduction; and the same sound system, if installed in normal surroundings would be too "high pitched". On the other hand, if a perfectly plain room, devoid of hangings, carpet, or soft material, and with hard plaster walls and ceiling, is used, it will lead one to the belief that there is too much high frequency response, while the same equipment, again under normal conditions, would probably sound very much more nearly perfect.

In the selection of speakers for small rooms, where a considerable number are to be driven from a central amplifier source, such as school class rooms and hotel and apartment rooms, it is very often necessary to use magnetics. The main reason for this is that the cost of running additional wires and additional switching arrangements for carrying and handling the field supply for dynamic speakers is sometimes prohibitive. While good, bad and indifferent speakers of this type are being offered by various manufacturers, there are now available speakers the reproduction of which is practically as good as the average dynamic on the moderately low volume levels used in such rooms. For all other installations, including large indoor areas, as well as every type of outdoor work, we run into what is still a somewhat debated question as to the advantages between the dynamic cone type and the large so-called air column speaker. While the personal experience of the writer over a period of several years, using practically every known American make of both types, under almost every conceivable working condition, has definitely fixed my opinion in the matter, the purpose of this article is to put before you the obtainable results with the various types of available equipment, without fear or favor, and to describe both the advantages and disadvantages of each type.

Where a maximum of projected sound is necessary with the least possible amount of amplification, and a somewhat restricted frequency range is permissible, and where a relatively large number of speakers, and their cost (as compared to the other type) is not a deterrent, score for the air column. Where, due to the characteristic of the amplifier or pick-up (for phonograph reproduction), excessive "button hiss" from carbon button microphone, or other causes; the reproduction with a high grade dynamic type speaker, properly baffled, contains too much "needle-scratch" or where overloading the tubes in the amplifier (which is an unbelievable prevalent practice), causes the reproduction to have a stringent, harsh character when using the speaker mentioned; score again for the air column. As a final tribute to the air column type, the smaller so-called "trumpets" using a magnetic unit, requiring no wires



to be run for field current supply, being light in weight, and easily carried and installed, have a definite value in last minute calls for rental or temporary installations, where voice only is to be projected. However, when really high grade reproduction of the full range of audible frequencies is essential or desired, and sufficient amplification can be furnished to produce the desired volume, from high grade amplifiers of relatively linear characteristic, the high grade dynamic, properly handled is above comparison with the other type. In upholding this statement, there are several points worth bringing up. One main argument of the disciple of the horn type is that one of the largest manufacturers of theatre talkie equipment uses the air column exclusively, and that the reproduction in many of these installations is "perfect." Approximately three years ago, two high grade dynamics were taken onto the stage of a large theatre in a California city, and the voice coils attached directly to the leads which were disconnected from the air column speakers that were a part of the equipment, and numerous auditors, including the operator at the house, all admitted that the improvement in reproduction was very pronounced, the operator saying that clear up at the booth, he could understand every word of the dialect, which he had been unable to do with the regular speaker equipment. The reasons for the use of the horn type in theatre work are numerous, one being that a very restricted range of frequencies are reproduced as compared to the properly baffled high grade dynamic. This does not sound like a point in favor of the horn type speaker, but it is, for the following reasons. Many of the manufacturers of theatre sound equipment do not find it possible to entirely eliminate various mechanical imperfections, such as quiver in the movement of turn tables (in disc reproduction), vibration of exciter lamp filaments, vibration of the photo-electric cell, imperfect projection of a sufficiently narrow, clean-cut light beam on the sound track, etc. As any and all of these imperfections result in definite distortion of the wave form of the recording, and as the resultant distortion is most noticeable audibly on the upper and lower portions of the audible range rather than the middle portion in which the fundamental voice frequencies lie, the horn type speaker, or air column, gives better apparent reproduction just because it is deficient on these upper and lower portions of the tone range. If these causes of distortion were met and corrected the reproduction with the high grade dynamic would be so much superior, in points of the indescribable characteristic of *naturalness*, and in the audible discrimination, not only of the difference between the voices of the male and female actors, but also between the different actors of the same sex, that the dynamic would soon

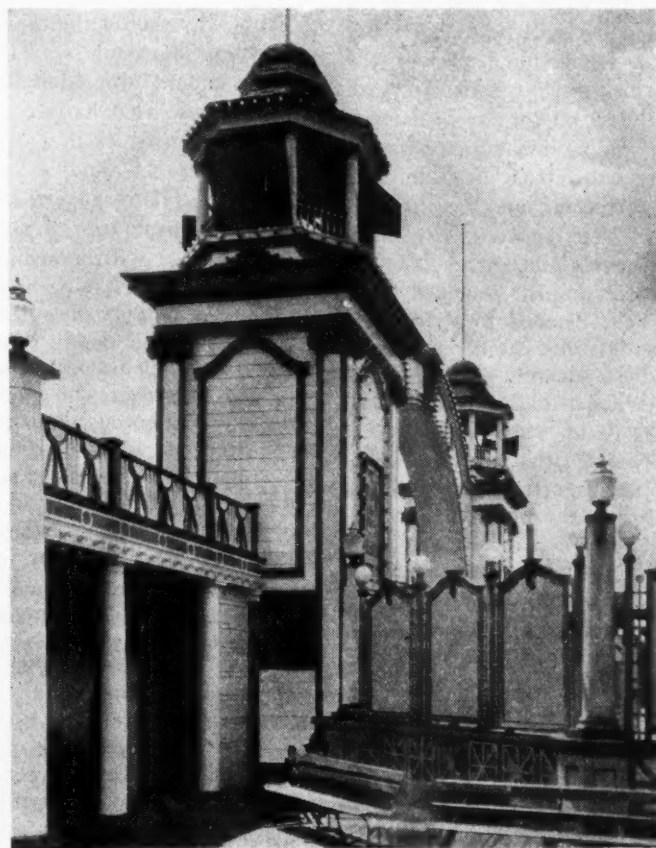
replace the other type in theatre application and stand supreme in that field as it already does in high grade radio receivers and in all of the better type of group address installations throughout the world.

The matter of coverage of an assemblage is another point in which the very flexible application of the dynamic is of great value. Recently the dedication of a new bridge in Chicago presented a problem in coverage where a crowd of several thousand people congregated over an area that extended not only from the speaker's stand to a point of approximately three hundred feet forward, but also for many hundred feet at right angles each way from the stand. It was also desired to cover both those standing on the drive, and to quite a height upward, to the many hundreds in the offices in the buildings facing the new structure, opposite the three hundred foot area. If any type or make of trumpet or directional projector had been used, it would have required a sufficient number of such units to form a completely closed semicircle to cover those on the ground, and an additional number in the same formation pointing upward to cover the offices. In the case mentioned, perfect coverage of the entire assemblage on the ground was had, and numerous reports from people in the upper floors of some of the buildings were that even with the windows closed,

and in spite of the very considerable "background noise" prevailing in this down town Chicago area; every word of the various speakers was clearly and distinctly audible in the offices. And this job was done with only two large dynamics, mounted on four foot flat baffles, each speaker being driven by a power output amplifier using a pair of 250 tubes. Where extreme distance projection of sound is the problem, equally efficient and outstanding results are obtainable with the same type of speaker using large airport type projectors, of proper size and design, as is evidenced by the many airports already so equipped, as well as college stadiums and ball parks. Assuming that in this article we have shown the logical reasons for the use of the dynamic type of reproducer in any kind of installation, the next article will attempt to outline the selection of the type of baffle or projector, and the number required for coverage in several standard kinds of installations to be met with, as well as the placement of the reproducers, and the reasons for such placement.

We will also go into the amplification necessary under varying conditions.

EDITOR'S NOTE—There is lots of untouched business in the sound apparatus field, and the radio dealer who wants it can get it only by making a study of the science. These articles are designed to give the reader the benefits of the experience of others and will be featured every few months.



In Chicago's largest and most popular amusement park, these Wright-DeCoster reproducers, seen in the "belfry" in this picture, roar forth their message above the clamor of roller coasters, and the din of carousals and barkers.



# What Is This Magic Box?

By T. H. WILSON

**T**AKE a look at twenty radio ads; listen to twenty radio salesmen tell their stories; and what have you? A head full of facts and figures about twenty different radio sets, prices cut to, prices cut from, down payments, monthly payments, matched walnut doors, tone controls, quality, sensitivity, construction, screen grid tubes, quick heating tubes, ordinary tubes, hums, guarantees, 100% replacements, and so on until your head swims. When you get through you pass everything but the price and the terms and the general appearance of the receiver. And you buy the cheapest set you can buy that does all the things the salesman says it will do.

Consider the average customer. There are two general classes of customers; one who has no radio set and hasn't a real conception of what its value in use will be to him; and one who is the owner of a more or less obsolete receiver, the performance and appearance of which are not satisfactory to him. The first customer wants to buy a set because his friends have them, or because he has been reading about the programs available to the radio listener. He knows that he is missing something or other by not having a receiver but there is room for doubt as to whether he knows *how much* he is missing. The owner of the radio set of ancient vintage may have become disgusted with the type of entertainment provided by it and for that reason he may not have listened to a program for months or even years. Or this class of customer might be using his set regularly, to the fullest advantage, being completely aware of the fact that it is incapable of reproducing the programs as he knows they ought to be reproduced.

The latter type is the easiest to sell on the idea of a large console. The man who has become disgusted with radio is the hardest to sell any receiver, while the uninitiated is all prepared to buy but wants the cheapest he can get that will give him what he thinks he wants; just radio entertainment.

The radio dealer has four things to sell his customer; quality of merchandise, including tone, appearance, sensitivity and selectivity; price and terms; the personality of his store and the quality of his service; and last, and least considered, the radio program. Nothing need be said about the first two items. Most dealers are doing a good job of selling their wares, as such, and the price appeal is worked to death. Those things take no imagination at all. Some dealers have completely made themselves by selling their names and their service. Others aren't doing such a good job of it but as that is a subject that should be considered by itself it will not be dwelt upon in this article. Let us talk now of *merchandising the radio program!*

From talking to radio dealers about this subject I have

chalked up two major objections to this idea of boosting the radio program, possibly at the expense of talking quality of merchandise and price appeal. They say, do the dealers with whom I have discussed this subject, that they are not interested in tooting anybody else's horn for them. The program should be promoted by the advertiser and the broadcast station or chain that profits from the sale of the radio advertiser's wares. All very true, as far as it goes. We'll come back to that later. The second point brought forth is that every customer who enters the radio store is already interested in radio reception or he would not have come in. That's true, also, as far as it goes.

Now why should the radio dealer be afraid to toot a radio advertiser's horn for him? Granting that it does the latter a certain amount of good by inspiring more people to listen to his programs, what harm can it do the radio dealer? That is, unless he owns stock in a competitive company. What matter if it be Amos 'n' Andy's Pepsodent, Colgate's fine orchestra or Charley Hamp advertising Dr. Strasska's toothpaste? If one of those programs can be described in such a way that the potential buyer will immediately kick himself where kicks are legitimate for not having been aware of it, he begins to loosen up. What difference does it make if you use Associated Ethyl or Shell 400 gas, if you can induce your enthusiasm for the Standard symphonies onto the mind of your customer? To be sure, the advertiser who buys time from one of the broadcast companies and spends thousands of dollars in giving the public a fine program, is not doing so to help you sell radio receivers but to help himself sell cigars or life insurance. The broadcast company is not spending its own money in doing the same thing for your benefit, either, but to make its stations more popular. And you, in your turn, even if you spend money in your ads and time in your sales talks boosting, say, Heel Hugger Harmonies, are not interested in the shoes you sell or the popularizing of a certain station, but in the enthusiasm you inspire in your customer. The three major elements in the radio business; broadcaster, program sponsor, and radio receiver manufacturer and merchandiser, go around in a continuous circle, aiding each other without giving a hoot about whether the other two parties to the triangle (it was a circle a moment ago) make a go of it or not. Good stations and good unsponsored programs on the part of the broadcasting company sell radio sets and make the medium more useful for the advertiser. The advertiser's good programs sell more radio sets and increase the value of the station as a medium. More radio sets distributed among the public by the dealer increase the circulation of the stations to the benefit of both broadcast com-





Is it merely

- a fine piece of furniture?
- a sensitive electrical instrument?
- a necessary household appliance?
- a carefully engineered mechanism?

Or—

- may it not be considered an implement of worthwhile entertainment?
- a key a untold pleasures?
- a tool of the searching mind?

pany and advertiser. Each of the three has his own objective; his aid to the other elements in the industry is entirely incidental.

Therefore let it be said that money and time spent upon tooting other people's horns is well spent if it increases your own business, regardless of how it affects the other man's affairs. Let us see, now, whether or not well planned radio performances can help the radio dealer increase his business.

In the first place there is no doubt that a dealer who knows his territory; knows what people have radio sets and what people have not; can use programs to excellent advantage in direct mail campaigns. Those people who haven't any radio sets at all usually just don't know what they are missing, and it would be the simplest thing in the world to consistently point it out to them. But how about the person who comes into the store? Practically all dealers agree that that man or woman is already sold on the idea and no time should be wasted in enthusing him or her unnecessarily. Right they are that the customer is sold on the idea, but to what extent? \$49.50 worth, or \$199.50 worth? Does the customer who walks into the store want a radio set just to have something to amuse himself with during the evening; something to keep his wife company during the daytime? Or has he been fired with enthusiasm over a symphony hour, a good jazz program, a mystery serial? If he has never owned a radio set has he just decided that one might be worth the money? Or has he read of programs that he feels he cannot do without? If he is the owner of an old set is he buying a new one because the old one no longer gives good service? Or has his appreciation for radio's offerings carried him to a place beyond the capabilities of his present receiver? If he wants to buy just for amusement or just because it might be worth the money, or just because his old set has given up the ghost, he will most probably have the down payment on a \$49.50 receiver already

counted out. If he buys because he intends to go home and listen to certain definite programs; to devote a part of his evening to the thorough enjoyment of the entertainment his receiver will bring him; he will be open to conviction as to the superior merits of a larger, more expensive console. That man wants the best that he can get, and he will dig down deeper than he intended if he can be convinced that the best reproduction can only be had in the more expensive set.

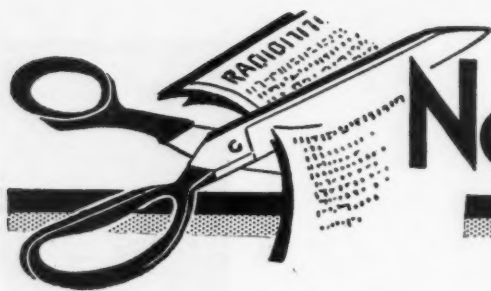
This customer who "eats up" the radio programs that appeal to him will be a valuable addition to the dealer's clientele, even after the profits derived from the sale have been spent. Enthusiasm cannot be quieted; it must find an outlet. The radio enthusiast talks programs to his friends just as the fisherman talks weights and measures. His enthusiasm is contagious and his friends become prospects—for you, if your service is right.

The ability to make the best use of a radio set is an art, just as getting the most possible value out of an electric washing machine or refrigerator is an art. A radio receiver in the home offers untold opportunities; opportunities that are seldom taken advantage of because the radio is taken too much for granted. Radio advertisers and broadcast companies are trying to educate the public to get the best out of radio, for their own good, of course. Radio manufacturers are not doing so much along that line, except where it applies to their own broadcasts. Radio dealers are doing practically nothing.

Let me ask again: What are you offering your customers? Radio material or radio entertainment? If you are offering them radio entertainment *sell* that entertainment! Study the programs. Go home at night and listen to them. Concentrate on them. Learn to appreciate them, yourself. Enthuse over them. And I think you will be surprised how the idea will take hold of the customer.

**Don't fail to read about the tube tester that RINGS A BELL when the tube is a good one - Page 40 of this issue.**





# News of the Month

## H. C. Bodman With Pfanstiehl

H. C. Bodman, formerly sales manager for Silver-Marshall, Inc., Chicago, has become associated with the Pfanstiehl Chemical Co., makers of rare chemicals and technical specialties with headquarters in this city.

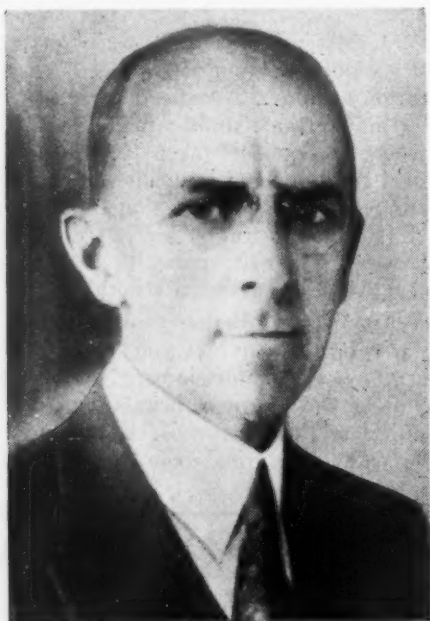
Carl Pfanstiehl, well known in the radio industry, heads the company which bears his name.

★ ★

## New Cunningham President

Appointment of George K. Throckmorton as president of E. T. Cunningham, Inc., radio tube company, was announced today by David Sarnoff, chairman of that company's board of directors. Mr. Throckmorton previously was executive vice president and general manager of the Cunningham organization.

The elevation of Mr. Throckmorton as head of E. T. Cunningham Inc., recognized as one of the largest and oldest national tube distributing organizations in the country, brings to this office a leading merchandising figure in the radio industry. The appointment represents the successful culmination by Throckmorton of many years of active service in the field of wholesale and retail selling in a number of merchandising lines.



Mr. Throckmorton



Mr. Cunningham

## Cunningham to Head RCA Radiotron Co.

Carried to the top of America's radio tube industry from a modest start in San Francisco 16 years ago, E. T. Cunningham becomes president of the RCA Radiotron Company.

Cunningham's election as head of the Radiotron Company brings to the position an outstanding figure in the development of the radio tube business in this country. His present age of 42 years ranks him as one of the youngest executives ever to attain a post of this importance in the industrial world.

In a statement made following the announcement of his appointment, Cunningham said:

"Radio industry in common with all industry has been going through a difficult period. There is very definite evidence that the dark clouds are passing. This is indicated by the fact that the public last year bought more radio sets than in 1928 and only slightly less than in 1929. The greatly lower average prices are set to meet today's pocketbook, and now no home need go without a radio to tap the air's continuous store of music, entertainment and education."

Cunningham's activities with his own companies were characterized by his leadership in better merchandising methods. His organizations constantly strove to improve trade conditions and to render the utmost in value to the public. Cunningham's new headquarters will be at Harrison, N. J.

## W. H. Hunter In Important Position With Capehart

Of extreme interest to the trade is the announcement that W. H. Hunter, formerly chief engineer of the Webster Electric Company, Racine, Wisconsin, has become associated with The Capehart Corporation, Fort Wayne, Indiana.

In his new connection with Capehart, Mr. Hunter is chief electrical engineer and in charge of Manufacturer's Division Sales. He brings with him a wealth of experience in audio and acoustic research and will concentrate on the more intensive development of tone quality for which the Capehart line is already widely known.

For the past 25 years, Mr. Hunter has specialized in audio and acoustics and during that time has served as consulting engineer in an advisory capacity to many companies engaged in radio production.

★ ★

## Foreign Markets Reported Good

Martin Openshaw, vice-president of Pilot Radio & Tube Corporation, has just completed a tour around the world. Mr. Openshaw reports a brisk foreign demand for Pilot products in some foreign countries. Export radio business, he says, has increased sharply during the past months.



Mr. Openshaw



## Insuline Moves to Larger Quarters

After five years spent in its quarters at 78-80 Cortlandt Street, which have become uncomfortably crowded as the result of the rapidly expanding activities of the organization, the Insuline Corporation of America is moving to 23-25 Park Place, also in New York City, on May 1.

"In the former News Building at 23-25 Park Place," states Mr. S. J. Spector, president of the Insuline Corporation of America, "we shall have a total floor space of 24,000 square feet, as compared with 12,000 in the quarters we are leaving. Also, the space will be arranged to the best possible advantage for production purposes as well as for the convenience of our customers, since we are planning the layout in accordance with our present requirements, in place of the scattered quarters resulting from our rapid growth."

★ ★

## Public Address

The engineering department of the Pacent Electric Company has prepared a manual on Public Address systems for the purpose of helping radio dealers to select and install sound equipment. Besides some excellent general information the manual contains tables giving different types of amplifiers needed to cover rooms of given cubical content when various types of loud speakers are used.

★ ★

## Representative Wants Lines

L. H. Bushnell, who is now the sole owner of Bushnell and Rayner, Pacific Building, Oakland, California, asks us to assist him in securing Pacific Coast representation for Amplifiers, Pick Ups, Motors, Tubes, and Home Talkie Equipment.

Manufacturers interested in representation can communicate directly with Mr. Bushnell.

★ ★

## Guarantee Motor Co. Crosley Distributor in San Antonio

Guarantee Motor Car Company, automotive distributors in San Antonio, Tex., since 1911, have been named as distributors of Crosley radio products, announcement to this effect being made by Harry L. Roper, state representative for Crosley Radio Corporation, Friday.

The new distributing concern will automatically take over the present set-up including 130 dealers in San Antonio and southwest Texas, Roper said, adding that he was extremely well pleased with the new connection, and felt that it would result in excellent service to both dealers and general public, due to the reputation of the well-established distributing concern and the high quality of the Crosley merchandise being offered for the present season.

## Here's List of Tube Prices

Following the lead of the RCA Radiotron Company it is understood that nearly all of the tube manufacturers have reduced their prices to accord with the following list:

	Old	New
UX -210.....	\$9.00	\$7.00
UY -224.....	3.30	2.00
UY -227.....	2.20	1.25
RCA-230.....	2.20	1.60
RCA-231.....	2.20	1.60
RCA-232.....	3.30	2.30
RCA-235.....	3.50	2.20
UX -245.....	2.00	1.40
RCA-247.....	3.00	1.90
UX -250.....	11.00	6.00
UX -280.....	1.90	1.40
UX -281.....	7.25	5.00

★ ★

## Pipe Organs and Refrigerators

The latest announcement of the Wurlitzer Company, old time musical instrument manufacturers and makers of the Lyric Radio, is the introduction of a line of electric refrigerators. There are five models in the line, the smallest having a capacity of five cubic feet. This will be known as The Mohawk electric refrigerator. One of its novel features is that it has two units, one for freezing and one for cooling.

★ ★

## E. J. Jordan Joins Gulbransen Company

Announcement is made by the Gulbransen Company that E. J. Jordan will handle the distribution of both Gulbransen pianos and Gulbransen radios in California, Oregon and Washington. Mr. Jordan enjoys a very favorable reputation as business executive and salesman and has had a particularly wide experience in the piano and radio field. For several years he was Vice President of the Miessner Piano Co., Milwaukee, Wis., and later Regional Sales Director for the American Piano Co. More recently he was General Sales Manager for the Harry Alter Co., Chicago, one of the largest radio distributors in the United States.

★ ★

## Is the Census Wrong?

(Continued from Page 21)

screen grid job the same selectivity as that which was referred to as "heater-type" (for some reason the heater in the '24 didn't count) saved the screen grid tube from complete disgrace. RCA was manufacturing superheterodynes. So were a few "bootleggers". The rest of the supers were kits. Sets that were bought in January were technically out of date by December.

1930

Engineers began to take things a little easier in 1930. The pentode gave every-

body a scare but was warded off. Quality was greatly improved over that which pleased in 1929. Cabinet styles changed just enough to keep in step with furniture trends. There were several passive attempts to popularize remote control and a couple of high priced receivers succeeded in putting over automatic volume control. The tone control came as near revolutionizing things as anything. (It is said that a mouse can stampede a herd of elephants.) The midget arrived and became popular with the public and notorious with the trade. It was much in need of improvement up until the fall. Some of them still are. RCA finally, after all these years, agreed to let its licensees make superheterodynes. And that simple little fact is now in the process of making T. R. F. receivers as obsolete as crystal detectors; for what reason nobody seems to know.

1931

The improved screen grid, variable amplification factor, super control tube; the power pentode; midget supers; automatic record changers for the flatter pocketbook; home talkies; television, maybe; and eight months to go;

Everything connected with the radio industry is changing. How long it will keep up is an enigma. At the present stage of the game radio broadcasting is a great deal more efficient than the reproduction of the same programs, although quality of reproduction seems to have been developed farther than public appreciation. It certainly looks like the census bureau will in all probability have a chance to make the same report in 1935.

This means more to the radio dealer and all others connected with the manufacture and distribution of radio receiving sets than any other subject. It means that, if 1931 is a normal year, there will be over three million radio receivers required for replacement purposes alone. New set sales should be as great as any year previously for the market has been just fifty percent saturated. If 1931 is not a normal year the next one that is will be a knockout. It means that there is no such thing as saturation, for when every one of America's twenty-eight odd million homes is equipped with a radio receiver the yearly replacement market will be something like seven million sets; more business, than the famous year of 1929 laid claim to. It is up to the manufacturer to provide for the obsolescence of sets that have been in use for a few years, so that the dealer's progress will not be impeded.

This looks like a super-optimistic view of the radio situation, and it is. But let the pessimists discount it by half—there will still be enough business to go around. The wise dealer will hang on tight—this radio business will amount to something.

# TOBE Filterette

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VOL. 2, NO. 5

MAY, 1931

CANTON, MASS.

## Approaching Summer Brings New Filterette Sales Possibilities Drug Stores, Tea Rooms and Confectioners' Shops Contain Interfering Appliances

With the approach of warmer weather there will, undoubtedly, be an increase in the number of interference complaints received from broadcast listeners who may be located near soda fountains. In fact, there are many receivers installed in drug stores, soft drink parlors, confectioners stores, tea rooms, and "sandwich shoppes" for the purpose of drawing trade, and entertaining customers. If full benefit is to be derived from the use of these receivers, local interference must be kept at the lowest possible level. And since many of the electrical appliances essential to the operation of soda fountains and lunch bars cause radio interference, it appears that an alert radio dealer by filterizing these appliances can render a real service to the owners of receivers in and near such places of business. Such a service naturally creates good will, and in many cases is known to have been responsible for the sale of receivers in the vicinity of the filterized store. It has also resulted in profit on the Filterettes applied as well as furthering Filterette and receiver sales to persons learning of the possibility of improving radio reception by filterizing home electrical appliances.

The importance of filterizing the electrical apparatus associated with soda fountains may more easily be appreciated when it is known that 11.42 per cent of all interference located by Tobe interference engineers, in the surveys conducted in the past 18 months, was caused by this type of equipment. The interference due to soda fountain and lunch room appliances, exclusive of sign flashers, comprise 18.37 per cent of all interference from electrical apparatus in stores, offices, factories and garages.

Realizing that every neighborhood contains one or several places where

drink mixers may be used, and that the radio interference from each of these



Fig. 1.  
Filterette Junior applied to drink mixer.

appliances may effect many radio receivers, it is evident that the 11.42 per cent of all interference may be disturbing 20 or 30 per cent of the present or potential broadcast listeners in a community. It, therefore, appears that the effort neces-

**The City of Los Angeles is to be congratulated on having as director of its radio interference suppression program so tireless a worker as Mr. George A. Walters. Mr. Walters' efforts in behalf of improved radio reception are proving so fruitful that other cities may well envy Los Angeles.**

sary to suppress the radio interference created by electrical apparatus used on and associated with soda fountains is worth while both as a matter of improving radio receiving conditions in the com-

munity, and as a matter of realizing an immediate profit from the sale of the necessary Filterettes.

The electrical apparatus in most common use may be divided into two classes:

In the first class are the appliances operated by small universal motors, and in the second place are appliances driven by repulsion starting, induction running motors.

First class: milk shaking machines, malted milk mixers, fruit extractors and small fans. Second class: dish washers, compressors, electric refrigerating equipment and carbonators.

In filterizing a soda fountain, the first appliances to be considered are those in class one. In practically all cases, a simple type of Filterette, the Junior, will be found satisfactory for suppressing this interference. Figure 1 shows the application of this Filterette to a drink mixer. It will be noticed that the Filterette is located within eight inches of the point at which the attachment cord is connected to the drink mixer, and that a short wire is connected from the Filterette binding post to the frame of the motor. In order to locate the Filterette as close as possible to the motor, the attachment cord of the appliance is cut and a standard separable connector is installed. It is always advisable to locate the Filterette as close as possible to the point at which the appliance connecting cord enters the appliance frame in order that there may be a minimum of cord from which interference may be radiated.

If a battery of from two to five drink mixers is installed on a fountain, it is possible to make a Filterette installation of improved appearance by using a single No. 110-PO Filterette in series with the power input leads to all of the mixers.



Figure 2 shows this Filterette being used with two mixers. When making an installation of this type, the Filterette should be so located that the connecting leads from the various appliances to the Filterette are of approximately the same length. The appliance attachment cords should be cut to the minimum length satisfactory for connections to the Filterette and the various appliances should be connected to the output receptacle of the Filterette by means of a standard three-way connector. A short wire should be run from the frame of each appliance to the Filterette binding post. This procedure should result in satisfactory suppression of interference from several milk shake machines or malted milk mixers.

The one appliance which may require a somewhat more effective type of Filterette than the Junior is the fruit juice extractor. Although the Filterette Junior is often found satisfactory for suppressing the interference from this appliance, there are occasions when Filterette No.



Fig. 2.  
Battery of drink mixers filtered by use of  
Filterette 110 P.O.

110-PO must be used. This Filterette is connected in series with the power input leads to the fruit juice extractor in exactly the same manner as the Filterette Junior. Regardless of the type of Filterette used, a short return connection from the Filterette binding post to the appliance frame is essential.

The one remaining appliance in class one is the small universal motor fan, which is becoming increasingly popular, and for which the Filterette Junior is well suited.

Note: If in any case it is desired to install the Filterette without cutting the appliance cord, the cord may be coiled into the smallest possible space, and its radiating length may be effectively reduced.

As this issue of the Filterette goes to press, Mr. K. A. Hathaway, Radio Consultant of the Chicago Daily News and Director of the activities of the Chicago Radio News Radio Interference Club, has just arrived in Canton to acquaint himself with the latest developments of the Tobe Filterette Laboratories. In the near future the Filterette Section of this magazine will contain an account of the progress which has been made by Mr. Hathaway's organization.

The apparatus in class two, when installed in communities supplied with alternating current, seldom causes serious radio interference, the interference usually being confined to a click on starting and to an interference lasting only until the starting mechanism of the motor throws out. As long as alternating current motors operating appliances in class two are in good electrical and mechanical condition, they should create only the interference, it is advisable first to inspect the starting mechanism, and second to check the grounding of the motor and its connecting wiring. If the starting mechanism is not functioning properly, the motor may cause radio interference during its entire period of operation. Adjusting the starting mechanism or installing a suitable Filterette will suppress the interference. Figure 3 shows the application of a No. 110 Filterette to a commercial ice machine having a motor drawing 4.6 amperes, at 110 volts. It will be noticed that all connecting wires between the Filterette and the motor are carried in BX.

A further possible source of interference from apparatus in class two is an intermittent contact between two metal parts of the apparatus. The compressor unit of an electric refrigerator or of a carbonator, is generally suspended on springs in order to minimize the transmission of mechanical vibration. If any part of the apparatus which is mounted on the spring suspension is allowed to make intermittent contact with other metal parts of the apparatus, radio interference will result. It is, therefore, necessary to bond together all metal parts of a refrigerator or carbonator installation.

In direct current districts there is likely to be, in addition to the interference possibilities just described, a possibility of interference due to rotary convertor or motor generator equipment used to supply alternating current to apparatus in class two. In addition to the Filterettes normally applied to the compressor or carbonator motors, it will be necessary to install a Filterette in series



Fig. 3.  
Application of Filterette 110 to a commercial  
refrigerator.

with the D. C. input leads to the convertor. This Filterette should be capable of handling the maximum continuous operating current of the convertor and should be designed to operate at the voltage of the D. C. line. Convertors of this type are most commonly connected to a 220 volt D. C. line, and Filterette No. 221 is the Filterette generally required.\*

Summarizing the types of Filterette required for application to soda fountain equipment, it may be said that plug-in types of Filterette such as the Junior and No. 110-PO may be applied to all of the apparatus listed in class one, and that Filterettes designed for installation in building wiring circuits are generally required for application to the electrical equipment in class two. The Filterettes most commonly required for this application are as follows:

Filterette	Working Voltage	Working Current
No. 110—110 v. a.c. or d.c.,		5 amperes
No. 131—110 v. a.c. or d.c.,		10 amperes
No. 221—220 v. a.c. or d.c.,		5 amperes

These Filterettes are contained in standard metal cabinets and are suitably fused to protect both the Filterette and the apparatus to which it is applied.

The Tobe Deutschmann Corporation will gladly recommend the exact number and type of Filterettes necessary to filterize in soda fountain or lunch parlor installation.

\*The comprehensive discussion of the procedure to be followed in suppressing motor generator or rotary convertor interference will be continued in an early issue of the "Filterette" Section of this magazine.

## TOBE DEUTSCHMANN CORPORATION

Filterette Division • CANTON, MASSACHUSETTS

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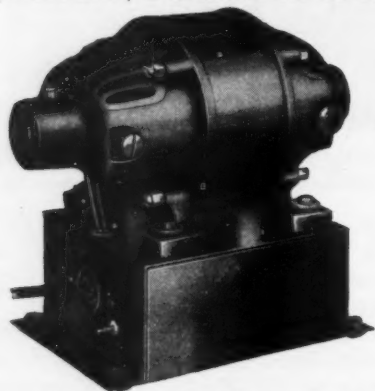
NEW YORK CITY  
136 Liberty St.

# New Radio Products

## Two New Converters Added to Janette Line

The Janette Manufacturing Company, 556 W. Monroe Street, Chicago, announces the addition of two new rotary converters to their line.

One of these new converters, called type CA-25-F, is available for 32 volts



d-c only. It develops 60 watts of 110 volt 60 cycle alternating current and its consumption is only 4 amperes. It is designed specially for the operation of a-c midjet sets on 32 volt farm lighting systems. Price, \$49.50 list.

The second new Janette Converter is called type CA-18-F. It develops an output of 150 watts of 110 volt 60 cycle a-c and is available for operation of 32, 115 or 230 volts d-c. Price, \$58.00 list.

## Magnavox Brings Out Symphonic Speaker

A new type of speaker made its bow to the radio world with the recent announcement by the Magnavox Company, Ltd., of a new Magnavox "140" Symphonic Speaker. "The new speaker brings revolutionary improvements in dynamic speaker construction," states R. A. O'Connor, president of the Magnavox Company. "These improvements, fully covered by patents and patent applications, make it possible to reproduce the full range of the human voice, military band, or symphonic orchestra, with every note clear and true at its natural value. There is no slurring, distorting or over-accenting of any instrument, from the bass drums to the flutes. Because of this perfect tone-harmony, we have called the new '140' a symphonic speaker to distinguish it from other types.

"In addition to improved tone, the new speaker offers many other advantages to manufacturers," Mr. O'Connor points out. "It answers the demand for lower cost, durability and dependability.

## Lyric Radio Announces New Pentode Chassis

Mr. E. R. Farny, president of the All American Mohawk Corporation, manufacturers of Lyric Radio, has announced the P 4, a small table model and the P 9, a console model. Both of these models employ the newest development known to radio, the pentode tube.

This pentode tube gives increased audio amplification, with the result that for full output volume the detector operates at lower output voltage and therefore does not overload. This means to the listener that he gets greater volume with full tone quality and it also means that the sensitivity is increased and the weaker stations are received at greater volume.

The P 4 mantle model lists at \$69.50 complete with tubes, the P 8 console model lists at \$89.50 complete with tubes and the P 9 console model lists at \$99.50 complete with tubes. Each of the above models employ the Lyric Pentode Chassis, six tubes, four of which are screen grid tubes type '24, one pentode tube and one '80 type tube.

## Clarostat Offers Replacement Guides

A handy pamphlet published by the Clarostat Manufacturing Company, 285 North Sixth Street, Brooklyn, New York is entitled "The Volume Control Replacement Guide" and contains information accompanied with circuit diagrams regarding the use of variable resistors in factory built receiving sets. It gives every possible use for a variable resistor in a receiving set and tells what resistance should be used for each function.

It is the sturdiest speaker on the market today, built to eliminate 'service'. It has a compactness, ease of mounting and accessibility heretofore unknown, which makes set-assembly much easier. Like the first loud speaker and the first dynamic speaker, both Magnavox inventions, the Symphonic Speaker opens a new era in radio reproduction."

To acquaint the public with the new speaker and educate them to buy radios equipped with it, a national advertising campaign is being launched in the Saturday Evening Post in which the unusual tone qualities of the speaker are presented in dramatic fashion.

## Clarion Superheterodyne Models Announced

Ross D. Siragusa, president of the Transformer Corporation of America, has announced four new Clarion superheterodyne models for the April trade. Two are of the mantel type, selling for \$67.50 and \$79.50 complete, while the other two are consoles, selling for \$84.50 and \$99.50 complete. Pentode power tubes are used.

## Pentode Service Testing Equipment

Many radio men who have investments in radio testing equipment are interested in the adaptability of this equipment for the new test requirements imposed by the new power pentode tubes. The new variable mu tubes will not apparently introduce any problems by way of design limitations in present testing devices.

In general appearance, the new power pentode tube is similar to the type '45, there being no top or side terminals. The base prongs or terminals correspond to the terminal arrangement of the type '27, except that the "space charge grid" of the new tube utilizes the terminal which corresponds to the cathode prong of the type '27. The space charge or pentode potential may be ascertained with present analyzers or testers in the manner prescribed for measuring cathode potentials, provided the meter range connected to the cathode switch contacts is adequate for accommodating the higher space charge potentials. These potentials will probably be about 250 volts.

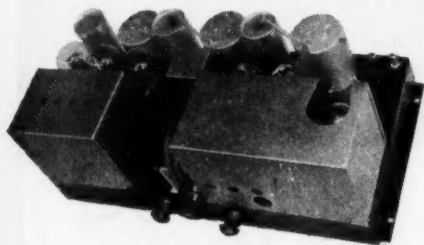
The Supreme Instruments Corporation has announced to the service trade that the Supreme Set Analyzer is adaptable without modification for measurements of all potentials involved in the new power pentode tubes. This adaptability is automatically provided by the switching arrangement which permits the optional connection of any range of the meter across any tube circuit; so that cathode or power pentode potentials may be read on meter ranges of 3, 9, 30, 90, 300 and 900 volts.

Adapters are being furnished for all Supreme tube testing devices, so that these may be immediately adaptable for the new power pentode tests. The average tube test readings of the new tubes will be published by the Supreme Instruments Corporation as soon as available for the information and guidance of all concerned.



## New Super By Silver Marshall

The Silver Marshall Company announces a new superheterodyne, to be sold both in chassis form and as a console receiver, which is equipped with



four of the new multi-mu tubes and two pentodes in the power stage. The receiver is said to be non-radiating and contains nine tuned circuits. A local distance switch is provided, not for the purpose of making the set more sensitive for distance reception, but for the opposite purpose of cutting down the sensitivity if the receiver is used within a mile or so of a powerful broadcasting station. A new shadow dial is incorporated in the set which has been designed to completely eliminate parallax.

## Pilot Universal Announced

A new combination-wave radio receiver of advanced design and construction, known as the "Universal Super-Wasp," has been brought out by the Pilot Radio & Tube Corporation, Lawrence, Mass. It covers the unprecedented wave-length range of 15 to 650 meters without the use of the plug-in coils that have characterized practically all short-wave sets, the shifting from one wave range to another, in seven steps, being done from the front panel by the mere turning of a knob. It is available in both factory-built and kit models, for either A. C. or battery operation.

While intended primarily for use on the short waves, for the direct reception of foreign stations, the new instrument is also a good broadcast receiver, and in addition takes in the calling waves used for ship-to-shore radio telegraphic traffic.

Supplied in a handsome walnut cabinet, the Universal Super-Wasp shakes off the laboratory air hitherto associated with short-wave apparatus, and takes on all appearance of a high-grade broadcast set.

## Kato Has 32 Volt Konverter

The new Kato Konverter is designed to operate on the 32 volt D. C. lighting plant, changing the latter into 110 volts A. C. for operation of a modern A. C. receiving set. One of the features of this system is that the Konverter consumes no more than 120 watts. These machines are designed to sell to the farm trade as well as to hotel residents and to owners of motor boats and yachts.

## Data Sheets For Technical Men

The second series of Radio Broadcast's data sheets has been recently published by Doubleday Doran and Company, Inc., Garden City, N. Y. This booklet contains 152 of the handy laboratory information sheets made famous by



Radio Broadcast, in addition to which are a good many circuit diagrams of recent radio receivers.

## New Midget By Jackson-Bell

Production of an eight-tube concert grand midget with several new innovations in this receiver field has just been announced by the Jackson-Bell Company of Los Angeles.

There are four screen grid tubes in this set, and two 245 tubes in push-pull amplification. The tone control unit permits a wide range of tone adjustment.

A Magnavox dynamic speaker of the latest design is incorporated in the new Jackson-Bell midget which lists as Model 68. The cabinet is of striking design, and although somewhat larger than other Jackson-Bell midget models, is still in the true midget class. The dimensions are 19¼ inches high, 16½ inches wide and 11 inches from front to back.

## New Cardwell Transmitting Condensers for Medium Powered Installations

The Allen D. Cardwell Mfg. Corp., 81 Prospect St., Brooklyn, N. Y., has recently placed on the market a group of special variable transmitting condensers, designed for medium powered installations and for amateur use.

Of particular interest, are the split stator condensers, having a common rotor and with the two stators insulated from each other. The two sections may be connected either in series or in parallel.

Cardwell split stator condensers are also available in models designed especially for receiving work. The type

202 E, 10 plate condenser with .000150 mfd. per section is very popular for short wave receivers, being especially useful for tuning push-pull circuits.

## Book Reviews

**THE RADIO HANDBOOK**, By James A. Moyer and John F. Wostrel, first edition; 886 pages, 5x7¼ in., illustrated with drawings. Published by McGraw-Hill Book Company, Inc., New York and London. Price: \$5.00.

This handbook is a detailed compilation of accumulated information on radio, television and sound motion pictures. The book is divided into 16 sections, the first four being devoted to the fundamentals of radio and electricity, a complete glossary of technical terms, tables, formulae and a study of radio accessories and instruments. Then follow seven sections on power supply systems, vacuum tubes and relative circuits, receiving and transmitting equipment for broadcasting and commercial use. The final chapters are for the engineer or student and contain discussions of laboratory equipment and methods, photo-electric cells, television, industrial applications of vacuum tubes, and a chapter on sound motion pictures.

The book is the most complete of its type yet published, and is prepared in a style that makes it as useful to the student and radio service man as to the engineer.

**RADIO FREQUENCY MEASUREMENTS**, By E. B. Moullin, M. A., A. M. I. E. E., M. I. R. E., reader in engineering science in the University of Oxford. Second edition; 487 pages, 6x9 in., 289 illustrations. Published by J. B. Lippincott Company, Philadelphia. Price: \$12.50.

The Theory and Practice of Radio Frequency Measurements is a handbook for the laboratory and a textbook for advanced students. It is a most complete treatise on laboratory measurements of radio frequency apparatus and circuits. The author has carefully and exhaustively defined and explained much of the fundamental theory underlying radio frequency phenomena and has investigated mathematically most of the errors which might occur to the mind of the reader.

## Our Mathematics Go Democratic

Due to a typographical error in the article entitled "Priming the Pump," by H. E. Ringold, in the April issue of RADIO, we may have led some of our readers to believe that a \$10.00 investment in record stock would be sufficient to conduct a substantial record business. In Mr. Ringold's article the figure was \$100, which, the author has learned, is enough to start up a splendid business in record sales. The editor of RADIO apologizes for the error.



*"they have been building  
Centralab Controls  
in these sets for years!"*

"Yes madam, this manufacturer, like most of the reputable radio builders, specifies CENTRALAB Controls. When you turn this knob for greater or less volume you get smooth, noiseless increase or decrease of power . . . a mighty important part of your radio".

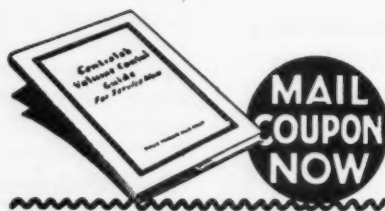
Because many dealers insist on CENTRALAB Controls more and more radio manufacturers are equipping their products with these quality controls.

# Centralab

CENTRAL RADIO LABORATORIES

914 Keefe Ave.

Milwaukee, Wis.



CENTRAL RADIO LABORATORIES  
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MILWAUKEE, WIS.

Enclosed find 25c for new VOLUME  
CONTROL GUIDE.

Name .....

Address .....

City ..... State .....

(Radio)



## CHICAGO

*The Marvel City*

is the ideal spot to hold conventions . . . because of its many places of historical interest . . . its wonderful Lake Front advantages . . . and its ability to handle crowds without congestion.

The place to make your home while in Chicago is THE NEW BISMARCK. Just a few blocks from the Merchandise Mart and the Wholesale District . . . on La Salle, the great financial street . . . in the theatre and amusement belt . . . and within easy reach of all points of civic interest.

It's the one Chicago hotel where your comfort and pleasure are the first consideration of the management. Luxurious lounges and rest rooms . . . Quiet, outside rooms, with comfortable beds . . . the best of food and service . . . and every modern convenience.

Rooms . . . . . \$2.50 up.

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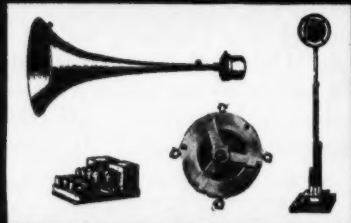
Send for booklet with map of Downtown Chicago

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BISMARCK  
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of Prospects  
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Sell A. C. Radios to the thousands of farm and city homes with D. C. service with the lowest priced converter ever offered. Adaptable to low-priced or expensive sets alike. In addition a special 60 watt unit designed for the operation of MIDGET sets on 32 volt farm lighting systems. Consumes only 4 amperes of battery current.

Send the coupon for full information and discounts.

*Janette Converters are guaranteed.*

## THE NEW JANETTE



Type CA-20-F

### Rotary Converter

#### JANETTE MANUFACTURING CO.

557 W. Monroe Street, Chicago, Ill.

Singer Bldg., 149 Broadway, New York, N. Y. • Real Estate Trust Bldg., Philadelphia, Pa.  
Harrison Sales Co., 314 Ninth Ave. N., Seattle, Wash.

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557 W. Monroe St., Chicago, Ill.

Please send me full information and discount on your new type-CA-20-F Converter.

Name \_\_\_\_\_

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City and State \_\_\_\_\_

### ONLY

### \$49<sup>50</sup> LIST

Complete with filter,  
cord, plug and A. C.  
receptacle

Tell them you saw it in RADIO



# Dealer's Service Department of **RADIO**

## RING THE BELL

By B. E. ESTES

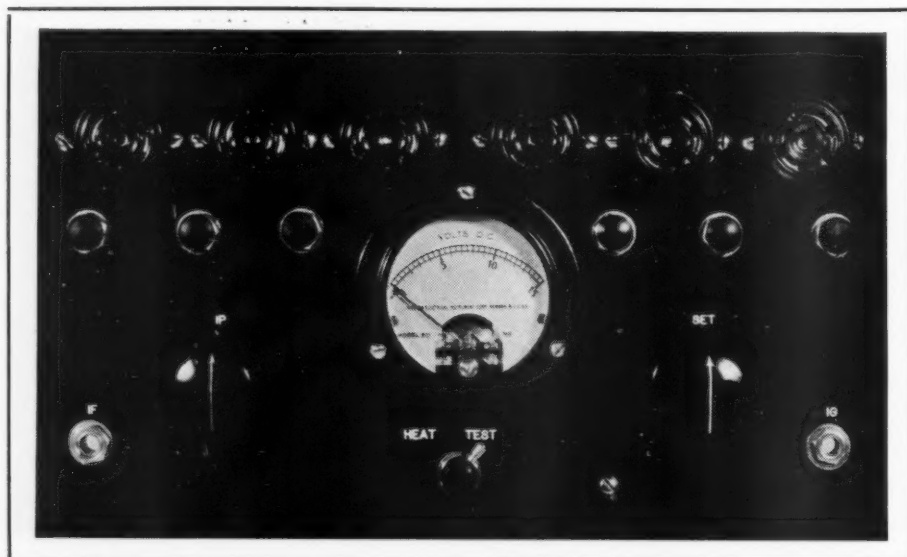
**T**UBE testing has always been more or less a mystery to the average customer. In too many cases it has even been a mystery to the clerks who

be placed about the store asking the public if their tubes will ring the bell, and inviting them to bring them in and try them free. This idea could be used in

as no complicated switching arrangements are used. The sockets for the six tubes are wired with their grids, plates, and filaments in parallel. The return for each cathode circuit is brought through an individual 5,000 ohm 2 watt resistor to a common point and from there through a 2,000 ohm rheostat to one side of the power transformer. The voltage drop across these resistors is used to supply a negative grid voltage of about 11 volts to the grid of each tube and limits the plate current of each tube to about 1 milliamperes. The 2,000 rheostat,  $R_2$  is variable for the purpose of adjusting the total plate current of all the tubes to the correct point for tube testing and the alarm relay.

A Yaxley No. 2001 push button is connected around each one of the 5,000 ohm resistors so that the grid voltage of any one of the six tubes can be changed by shorting out the cathode resistor. The shorting of the resistor gives an indication of the mutual conductance as the resulting change in grid voltage will cause a change in plate current of the tube which can be read on the plate milliammeter.

The meter used in the tube tester is a 0-15 milliamperes range Model 301 Weston, although any other meter of the same range and type may be used. Connected between the meter and the high voltage winding of the power transformer is a relay which in this case was a Westinghouse S No. 695634. This relay will make contact with a current of 6 milliamperes flowing through the winding, and is also provided with a lag loop so that the pulsating d-c from the tube circuit will not cause chattering at the contacts. Across the relay is connected a shunting rheostat of 6,000 ohms maximum resistance which is used to adjust the sensitivity of the relay. The contacts of the relay are connected so as to close the circuit to the primary of a 6 volt bell ringing transformer which will in turn give an alarm by operating a bell.



have "pushed the button." The customer, at least, cannot be expected to know what meter readings mean, even if he is allowed to view the proceedings. Yet he is interested; sometimes even suspicious of what is going on. It would be woefully easy to "take him into camp" and he knows it.

Manufacturers of modern tube testing equipment now realize that good psychology in selling tubes is to let the customer see what is going on and determine for himself whether the tube is good or bad. The instrument to be described has a very unique feature. When a tube being tested has enough emission to be classed as a good tube it rings a bell. If it is poor the bell is silent. In using the instrument it might be wise for the dealer to keep a couple of low emission tubes alongside it so that the customer can see that the bell doesn't lie. Enterprising dealers will see many means of using this instrument to advertise their tube departments. Signs can

newspaper and direct mail advertising as well. Curiosity, alone, will cause many of the customers to listen to their tubes "sound off."

Then there are other very valuable uses for the tube tester described; uses of especial interest to the service man. One of the worst evils in servicing is due to the "intermittent" tube; the tube in which the cathode shorts to the heater intermittently. When the service man tests a set of tubes it is very likely that all of them will be operating perfectly. If he suspects one of them of having an intermittent short he is in for a very wearisome and expensive job of waiting for the short to show up. With this tester he can leave the set in the six sockets provided and go about his work until the bell rings. It is then a comparatively easy matter to locate the defective tube by pressing the grid test button which is under each socket in the tube tester.

The circuit used in this tube tester is shown in Fig. 1 and is very easy to wire

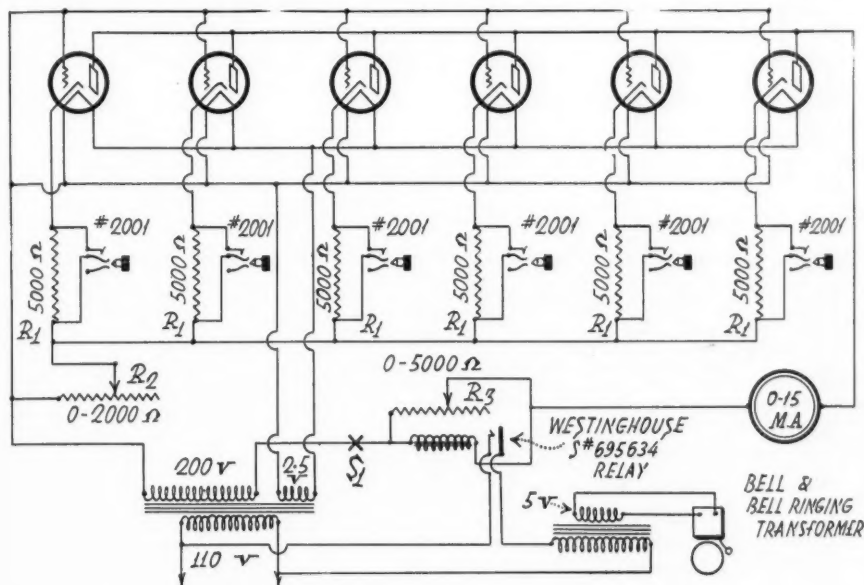


The transformer used to supply the plate and filament voltage to the tubes can be especially constructed for the job but in this case was made by removing one half the high voltage secondary winding of a transformer formerly used for a B eliminator. The remaining winding serves for the plate voltage and the filament voltage is supplied by winding a  $2\frac{1}{2}$  volt secondary with No. 12 wire in place of the secondary that was removed.

In operation the rheostat  $R_2$  is adjusted until the total plate current of all the tubes is 6 milliamperes as indi-

ropped to 3 milliamperes, which would mean that the rheostat would have to be adjusted to very insensitive position unless the bell was stopped by opening the switch.

The theory of the operation of the alarm circuit is that the cathode and filament of the tubes are connected to the opposite ends of the cathode resistors. As long as there is no leak from the filament to cathode of a tube there will be no effect upon the value of the cathode bias resistor. If, however, there is a leak or short from cathode to filament in the tube, this resistor will be shunted or

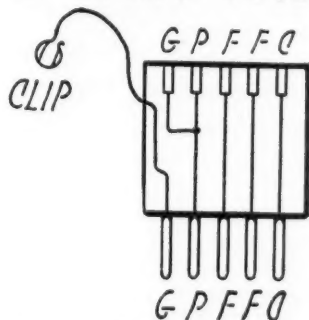


cated by the plate circuit milliammeter. If the alarm rings at this setting it can be stopped by adjusting the sensitivity control of  $R_3$ . Each tube is then tested in turn by shorting the cathode resistor of that tube by means of the push button. A good tube should change the plate current flowing through the meter by about 4 milliamperes when the push button is pressed. A note should be made of the change of plate current of each and kept for reference if the tubes are going to be tested for shorts or leak from filament to cathode by means of the alarm bell.

After all of the tubes have been tested the alarm relay is adjusted for the greatest sensitivity by means of the rheostat  $R_3$ . With the plate current held steady at 6 milliamperes the rheostat is adjusted until the bell rings. The rheostat is then backed off a slight bit and the switch is opened and then closed. If the rheostat has backed off enough the bell will not ring when the switch is closed and the relay will be in the most sensitive adjustment for the detection of shorted filament to cathode tubes. If the bell rings when the switch is closed the rheostat should be backed off a slight bit more and the operation repeated. The reason for the opening and closing of the switch is that the relay is so constructed that it will not drop out until the current has

shorted and the negative grid voltage applied to the tube reduced. As a result, the plate current of the tube will increase and as the relay is on the very edge of going in, the extra plate current will cause it to make contact and ring

### 5 PRONG TUBE BASE



the alarm bell. In practice it was found that the relay could be adjusted to a point sensitive enough to allow a 20,000 ohm resistor connected from cathode to filament of a tube to set off the alarm.

After the alarm has been set off the defective tube can be found by pressing each one of the push buttons in turn and comparing the reading with that obtained when the tube was first tested. The tube that gives a small or no plate current change will be the defective tube. If 24 type tubes are to be tested it will be necessary to use an adaptor of the type shown in Fig. 2.

\* \* \* \* \*

**Tube Dealers:**

\* Don't fail to read and have \*  
 \* your service man read the article \*  
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 \* it is described a simple, easily \*  
 \* constructed tube tester that will \*  
 \* ring a bell if the tube is good. \*  
 \* Your customers will appreciate \*  
 \* this tube testing service that they \*  
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\* \* \* \* \*

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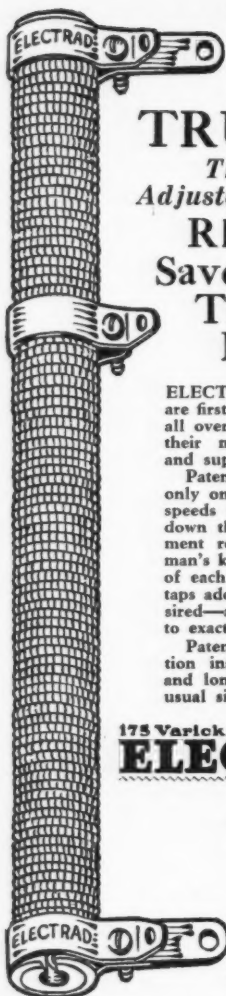
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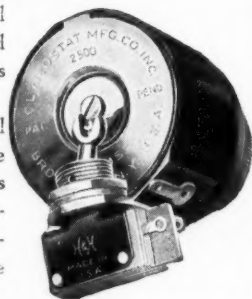
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"RADIO," published monthly at San Francisco, Calif., for April 1st, 1931.

State of California, County of San Francisco, ss. Before me, a Notary Public in and for the State and county aforesaid, personally appeared H. W. Dickow, who, having been duly sworn according to law, deposes and says that he is the Publisher of "RADIO," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

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Sworn to and subscribed before me this 6th day of April, 1931.

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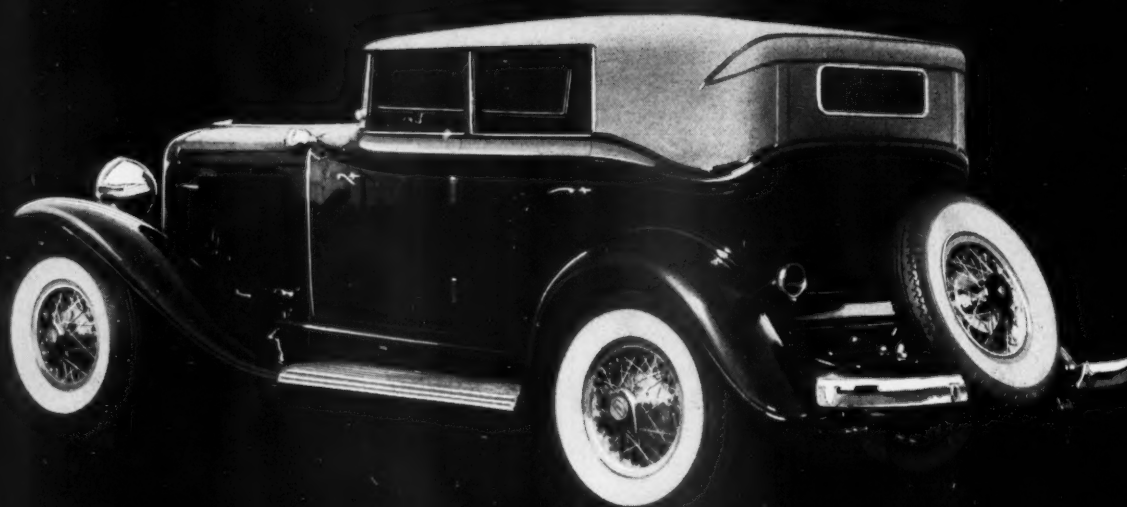
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We have heard the question so many times from dealers just getting started with Short Wave equipment that we have decided to publish, herewith, the list that we furnish with the Sargent Short Wave Converter. This list contains broadcast and telephone stations only, and is as accurate as present Short Wave conditions will permit. For a number of these schedules we are indebted to "International Short Wave Club," Klon-dyke, Ohio.

Wave Converter Length	Dial	Station	Schedule (Pacific Standard Time)
Low Coils			
18.0	8	LSN, Buenos Aires, Arg.	11:00 A.M. to 5:00 P.M.
18.37	9	VK2ME, Sydney, Australia	Tests irregularly.
18.5	10	FZR, Saigon, Indo China	8:00 to 9:00 A.M.
18.56	10	GBX, Rugby, England	1:00 to 8:00 P.M.
18.8	12	PLG, Bandoeng, Java	3:00 to 6:00 A.M.
19.56	16	W2XAD, Schenectady, N.Y.	11:00 A.M. to 1:00 P.M.
19.72	17	W8XX, Pittsburgh, Pa.	Wed. Sat. 4:00 to 8:00 A.M.
20.5	20	XDA, Mexico City, Mex.	11:30 A.M. to noon
20.7	21	GBW, Rugby, England	6:00 A.M. to 1:00 P.M.
20.95	22	G2NM, Sonning-on-Thames	Sun. 10:30 A.M. to noon
22.0	28	LSN, Buenos Aires, Arg.	11:00 A.M. to 2:00 P.M.
22.5	30	GLSQ, SS Olympic, also GFWV, SS Majestic	Irregular, all hours.
23.7	36	CJA, Drummondville, Can.	11:00 A.M. to 2:00 P.M.
24.23	39	GDJL, SS Homeric	After 10:00 A.M.
24.41	40	GBU, Rugby, England	11:00 A.M. to 4:00 P.M.
24.46	40	FTN, St. Assise, France	8:00 to 9:00 A.M.
24.6	41	GBS, Rugby, England	11:00 A.M. to 4:00 P.M.
25.25	44	W8XX, Pittsburgh, Pa.	8:00 A.M. to 6:00 P.M.
25.36	44	K1XR, Manila, P. I.	Irr. 10:00 P.M. to 6:00 A.M.
25.4	45	I3RO, Rome, Italy	8:00 to 9:00 A.M., also 11:00 A.M. to 2:30 P.M.
25.53	45	G5SW, Chelmsford, Eng.	Mon. to Fri. 4:30 to 5:30 A.M. also 11:00 to 4:00 P.M.
25.6	46	CJRX, Winnipeg, Canada	2:30 to 5:30 P.M. daily, runs until 7:30 Tues., Thurs., Sat.
25.65	46	KIO, Kahuku, Hawaii	Irr. 11:00 A.M. to 5:00 P.M.
26.1	48	K1XR, Manila, P. I.	Irr. 1:00 to 3:00 A.M.
27.3	54	ZLW, Wellington, N. Z.	Midnight to 5:00 A.M.
28.5	59	VK2ME, Sydney, Australia	10:00 P.M. to 4:00 A.M.
28.9	61	LSX, Buenos Aires, Arg.	5:00 to 7:00 P.M.
30.15	67	GBU, Rugby, England	2:00 to 8:00 P.M.
30.3	68	LSN, Buenos Aires, Arg.	3:00 P.M. to 3:00 A.M.
30.5	69	NRH, Heredia, Costa Rica	2-3, 7-8 P.M.
30.6	69	GBW, Rugby, England	2:00 to 7:00 P.M.
Int. Coils			
31.3	5	W1XAZ, Springfield, Mass.	Irregular
31.3	5	K1XR, Manila, P. I.	Irr. 11:00 P.M. to 6:00 A.M.
31.3	5	PCJ, Eindhoven, Holland	Thurs. 3 to 7 P.M., also Fri. 4 to 9 P.M.
31.3	5	W3XAU, Philadelphia, Pa.	5:00 A.M. to 1:00 P.M.
31.38	5	Zeesen, Germany	Noon to 3:30 P.M. Irr.
31.48	6	W2XAF, Schenectady, N. Y.	2:30 to 8:00 P.M.
31.55	6	VK3ME, Melbourne, Aus.	Irr. Midnight to 3:30 A.M.
31.7	7	Buenos Aires Radio Club	2:00 to 5:00 P.M.
32.1	11	CGA, Drummondville, Can.	3:00 P.M. to 3:00 A.M.
32.2	11	LST, Buenos Aires, Arg.	Testing 3:00 to 5:00 P.M.
32.4	11	GBK, Bodmin, England	3:00 P.M. to 3:00 A.M.
33.25	12	GBS, Rugby, England	3:00 P.M. to 3:00 A.M.
34.0	15	VK2UZ, Sydney, Australia	Irr. Midnight to 6:00 A.M.
34.1	15	GLSQ, SS Olympic, also GFWV, SS Majestic	Irr.
25.5	18	WSBN, SS Leviathan	Irr. Evenings
36.0	21	G2AA, Rugby, England	3:00 P.M. to 3:00 A.M.
37.0	23	PLW, Bandoeng, Java	1:00 to 4:00 A.M.
37.0	23	J1AA, Tokio, Japan	Testing 2:00 to 5:00 A.M.
37.76	25	VK2ME, Sydney, Australia	Tests Midnight to 4:00 A.M.
39.4	31	Prado, Ecuador	Thurs. 6:00 to 8:00 P.M.
39.7	31	HKF, Bogota, Colombia	2:00 to 4:00 P.M. and 8:00 to 10:00 P.M.
42.9	40	GBS, Rugby, England	3:00 P.M. to 3:00 A.M.
43.7	42	KEL, Bolinas, Calif.	Irr. Tests with J1AA
44.6	45	VRY, Georgetown, Br. Guiana	Wed. 4:15 to 6:00 P.M. also Sun. 2:45 to 6:00 P.M.
48.1	56	HKC, Bogota, Colombia	5:00 to 8:30 P.M. ex. Sun.
48.62	57	HRB, Tegucigalpa, Hond's	M., W., Fri., Sat., 6 to 9 P.M.
48.7	57	VE9CL, Winnipeg, Canada	3:00 to 7:00 P.M. Irr.
48.86	57	W8XX, Pittsburgh, Pa.	Wed., Sat., 2:00 to 8:00 P.M.
49.0	57	—, Saigon, Indo China	4:00 to 6:00 A.M. Sun. 3 to 6 A.M.
49.02	57	W2XE, New York City	5:00 A.M. to 9:00 P.M.
49.18	57	W3XAL, Boundbrook, N.J.	2 to 3 P.M., 7 to 9 P.M.
49.22	57	VE9GW, Bowmanville, Can.	3:45 to 6:30 A.M., 2-9 P.M.
49.3	58	HS2PJ, Bangkok, Siam	3:00 to 3:30 A.M.
49.34	58	W9XAA, Chicago, Ill.	4 to 6 A.M., 4 to 7 P.M.
49.5	58	8XAL, Cincinnati, Ohio	10:30 A.M. to noon, 3:10 to 3:30 P.M.
49.5	58	W3XAU, Philadelphia, Pa.	1:00 to 8:00 P.M.
49.7	59	3AN, Sourabaya, Java	Irr. 3:00 to 6:00 A.M.
49.7	59	W2XAL, Coytesville, N. J.	Irr.
49.83	59	W9XF, Chicago, Ill.	12:30 to 4 P.M.-5:30-10 P.M.
52.7	67	U. S. Airport Stations and Airplanes	daytime.
High Coils			
62.7	15	UZA, Drummondville, Can.	Irr.
65.1	20	WSBN, SS Leviathan	Irr.
70.1	26	RV15, Khabarovsk, Russia	Midnight to 6 A.M.
72.7	30	GLSQ, SS Olympic, also GFWV, SS Majestic	Irr.
85.0	45	Amateur Phone Band	24 hours, all countries.
95.4	55	U. S. Airport Stations and Airplanes	night wave.



Sargent Short Wave Converter

## The Most Efficient Way To Receive Short Waves—

Highly efficient Short Wave circuits in the Converter, plus tremendous screen grid amplification, power detection, push-pull audio and dynamic speaker! What more could be asked for a perfect Short Wave Receiver? Yet, that is exactly what you get when you combine the Sargent Short Wave Converter and any up-to-date screen grid receiver. Is it any wonder that stations 3000 miles away come in with the clarity and volume of "locals"? Or that under proper conditions the distance range of the combination may run to 10,000 miles or over? Can you think of anything that could be put into a complete Short Wave Receiver that isn't already found in more highly developed form in the Converter-Receiver combination? Neither can we!

## This Converter—

1. Works with any Screen Grid Receiver.
2. Contains its own Power Plant.
3. Connects between the Antenna and the Receiver.
4. Covers 19 to 100 Mc.'s Wave-length with Standard Coils.
5. Has a handsome, Polished Walnut Cabinet.
6. Is an Asset to Any Dealer's Store.

Price, Less Tubes, \$69.50

## "Television Coils"—Now Ready—

The Television Broadcasting Band was definitely allotted when W2XCR, New York, came on the air on 147 meters. There is just one way to get clear, strong and steady Television signals—use a Sargent Converter with Television Coils. These coils sell for \$3.50 per pair and cover a band of approximately 100 to 200 meters.

## Dealers.—Time To Get Going!—

With Short Wave interest at the boiling point and Television breaking right now, no dealer can afford to be without a good, reliable means of receiving Short Waves. You need a Converter to show your customers, and to enable you to personally get some first hand information on what Short Wave reception is all about. Don't be left behind the parade—ORDER ONE TODAY. Discount is 40% and we are making IMMEDIATE DELIVERY. For quicker service WIRE YOUR ORDER.

LOOK  
FOR  
THIS  
SYMBOL



It Signifies  
the Ultra in  
Satisfactory Long  
Distance Reception

RADIO CONSTRUCTORS COMPANY,  
357 Twelfth Street,  
Oakland, Calif.

Cable Address  
"RADIOSTRUX"

Here is \$ deposit for which please ship me, balance C.O.D., one Sargent Short Wave Converter at regular dealer price. If you have a distributor in my territory who is carrying a stock please ship the order through the distributor, otherwise send it direct.

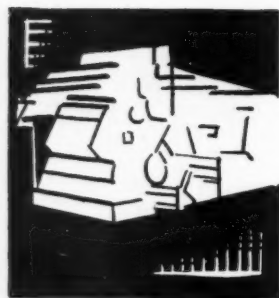
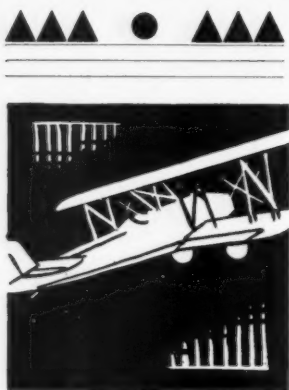
NAME

ADDRESS

CITY AND STATE

All except Prepaid Orders sent C. O. D.

Tell them you saw it in RADIO



## Last Call for TRADE SHOW COPY

- ◆ One Day Air Mail Service.  
Get Your Copy Out Today.
- ◆ The Postman Delivers Your  
Advertisement to Us the  
Next Day.
- ◆ Your Advertisement Goes to  
Press 4 Hours Later.
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Will Be in Distribution  
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in **RADIO**  
The National Trade Magazine

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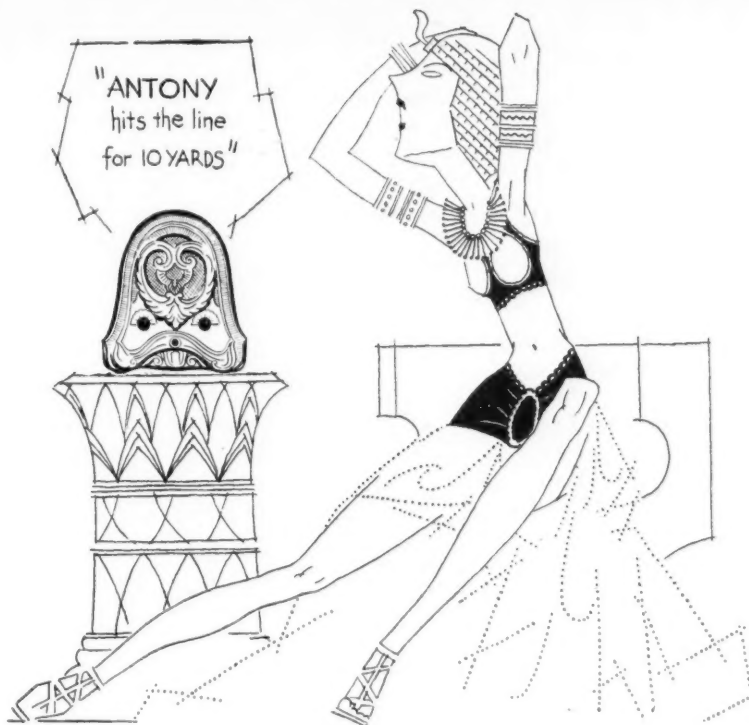
BOSTON . . . . .  
86 St. Botolph St.

SAN FRANCISCO  
Pacific Building

Tell them you saw it in RADIO



These Anachronisms are the basis for an interesting radio program from WLW, Cincinnati (700 KC., 428.3 meters), every Wednesday night at 8:00 E. T.



This is a reproduction of a CROSLEY national advertisement appearing in such magazines as:

The Saturday Evening Post  
American Weekly  
Collier's  
Liberty  
New Yorker  
Sportsman  
Time

## When Mark Antony went forth to battle Cleo was THERE with a CROSLEY!

Mark was too great a showman to allow the girl friend to forget him when he left town on a speaking tour. So he bought Cleopatra a radio so that she and all the neighbors could hear about him even if they couldn't see him. Mark was the original broadcaster and Cleo . . . well you know Cleo was **there** (among other things) . . . **with a Crosley.**



The CROSLEY WIGIT

Now comes the sensational CROSLEY WIGIT — a small-size, low-priced, super-performing radio receiver readily adaptable as a personal radio set for every member of the family and capable of bringing in distant stations in a sensational way. It incorporates THREE Screen Grid tubes, Neutrodyne circuit, electro power speaker and Mershon condenser. The one-piece cabinet is of

Crosley Repwood "B". The sensationally low price is especially enticing. Other Crosley models include The BUDDY BOY at \$59.50, *complete with tubes*, and a SENIOR SUPERHETERODYNE (Pliodynatron) Series of console models starting at \$109.50, *complete with tubes*. You can obtain complete information from your Crosley distributor.

**\$39.75**  
Complete  
With Tubes

### THE CROSLEY RADIO CORPORATION

POWEL CROSLEY, Jr., President

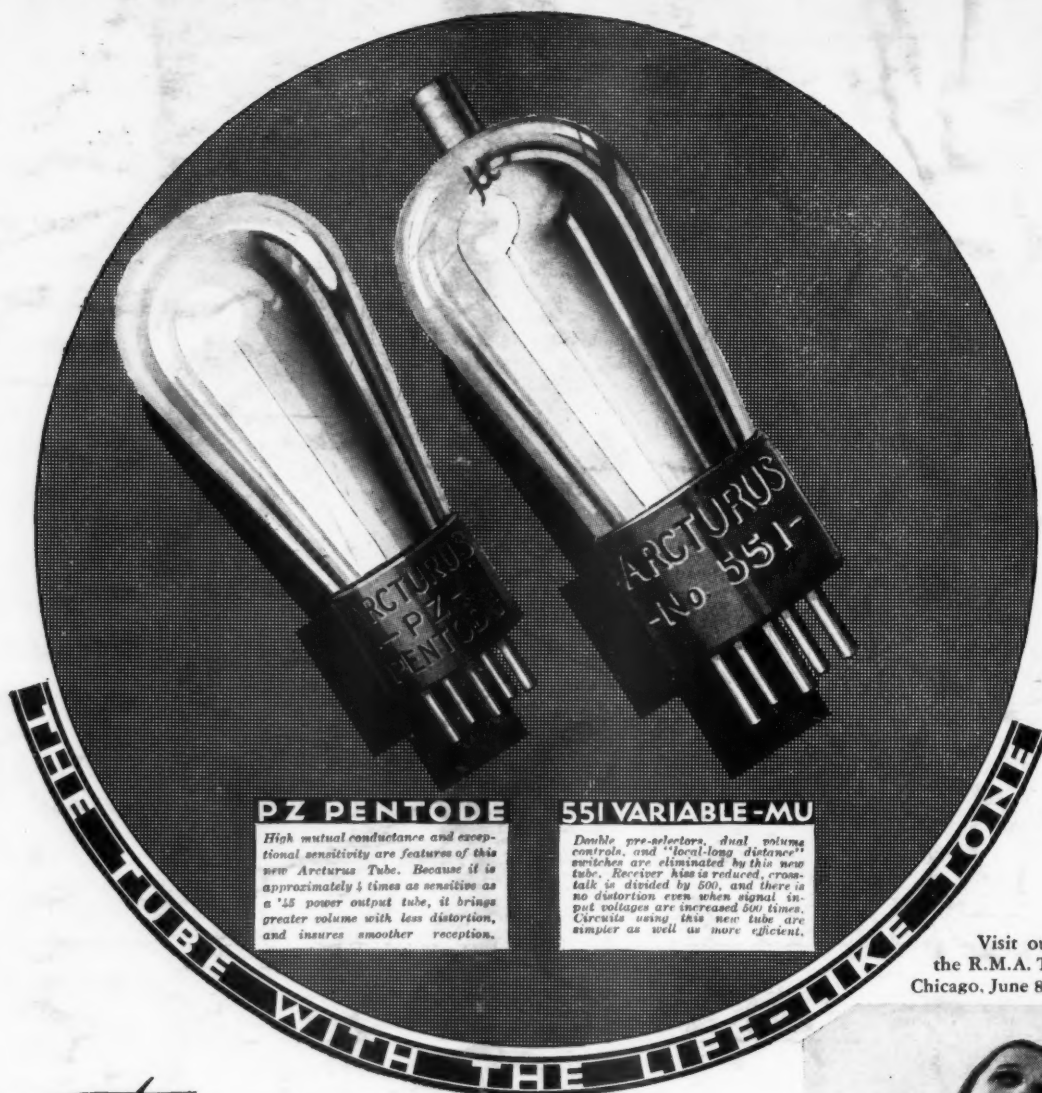
Home of "the Nation's Station" — WLW

CINCINNATI

Also manufacturers of CROSLEY Battery Radio Receivers, and the CROSLEY ROAMIO Automobile Radio Receiving Set

YOU'RE THERE WITH A CROSLEY

# CROSLEY RADIO



Visit our Booth at  
 the R.M.A. Trade Show,  
 Chicago, June 8-12

## These two tubes blazed the way to 1931 RADIO IMPROVEMENTS

At the 1931 R.M.A. Trade Show many new radio receivers will use Pentode and Variable-Mu Tubes.

Arcturus has an unusual interest in these improved sets, for Arcturus Tubes played an important part in their design.

In 1928, long before Pentode circuits were considered commercially, Arcturus sent sample Pentode Tubes to several manufacturers. Today's Pentode receivers are based on the characteristics of these early Arcturus Tubes—the Arcturus Pentode of 1931 is fundamentally the same as the Arcturus Pentode of 1928.

Again, in 1930, Arcturus assisted in the development of the Variable-Mu Tube. Most Variable-Mu receivers follow the characteristics of these Variable-Mu Tubes, justifying Arcturus' endeavor to anticipate the trend of radio progress.

Arcturus is proud to have once again introduced two tubes that are approved by leading radio manufacturers, and have helped bring about fundamental radio improvements. This is typical of Arcturus' pioneering spirit. Arcturus will always offer the latest types of tubes, insuring Quick Action and Lifelike Tone for the most up-to-date radio receivers.



ARCTURUS RADIO TUBE COMPANY, NEWARK, N. J.

# ARCTURUS

1088 Howard Street, San Francisco, Calif.  
 443 S. San Pedro Street, Los Angeles

West Coast Representatives:  
 UNIVERSAL AGENCIES

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